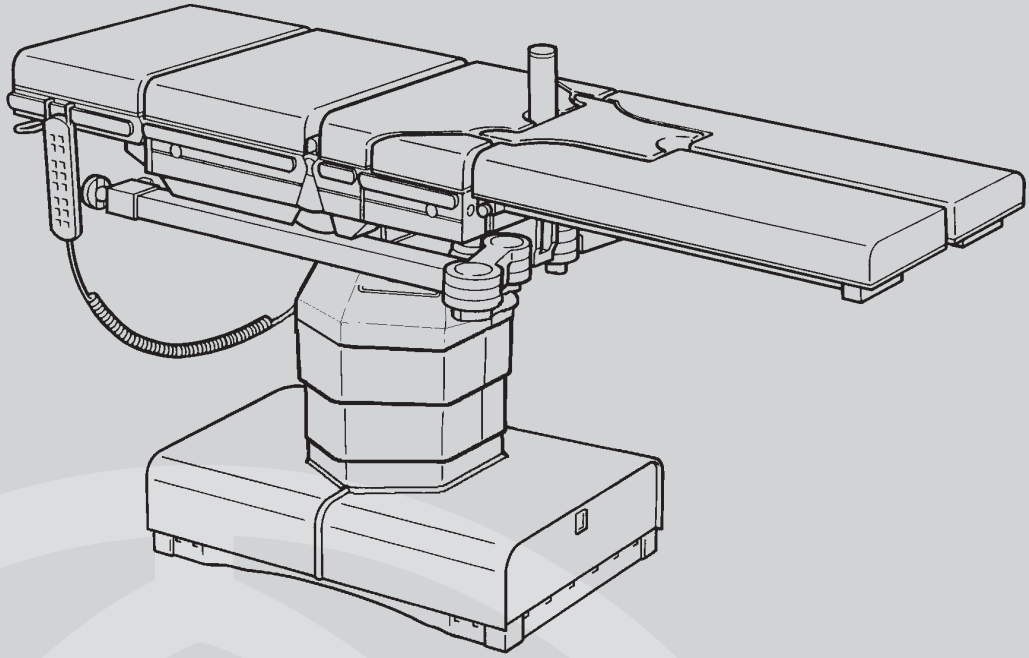
ESCHMANN

RX600

OPERATION TABLE



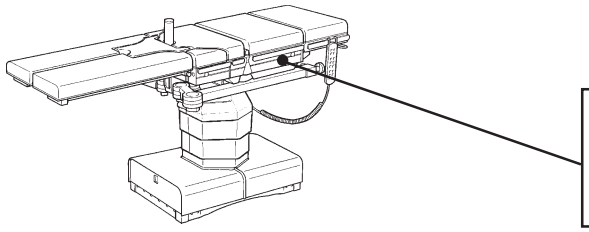
Service Manual

606049

T-SM14g

Eschmann After Sales Service Department

The Eschmann After Sales Service Department is staffed and equipped to provide advice and assistance during normal office hours. To avoid delays when making enquires, please quote the Model and Serial Number of your Operation Table which is shown on the Serial Number plate, the location of which is shown below. Please ensure you include all alpha and numeric digits of the Serial Number.



The Serial Number plate can be found on the inside of the long trunk section casting indicated here.

For further information visit www.eschmann.co.uk

All correspondence relating to the after sales service of Eschmann Equipment to be addressed to :

UK Customers

Eschmann Equipment, Peter Road, Lancing, West Sussex , BN15 8TJ, England.
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Overseas Customers

Contact your local distributor. In case of doubt contact Eschmann Equipment.

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“Eschmann Equipment” is a trading name of Eschmann Holdings Limited.
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Patents: GB 2260075 & GB 2242624; France 536922 & 450836; US5116032; Germany P69206378.1 & P69104883.5; Italy 536922 & 450836. Patents pending in Japan, application numbers 263630/92 & 97990/91.

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CE If the CE mark is affixed to the product, it indicates compliance with Council Directive 93/42/EEC of 14 June 1993 concerning medical devices.

T-SM14g October 2002

CE

Service Manual

READ THESE INSTRUCTIONS BEFORE USE

Keep these Instructions in a safe convenient place for future reference. Read in conjunction with the relevant Publications detailed in the preliminary information section.

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1. PRELIMINARY INFORMATION

1.1 This Service Manual should be referred to for details of the RX600 Powered Operation Tables, REF 80-606-59 and REF 80-606-13, Serial Number R6AC9K1001 or above.

Related Technical Publications available on request :-

Instructions for Use - T-IM33 (issue 'd' or later) - RX600 Powered Operation Table
Illustrated Parts List - T-IPL13 (issue 'b' or later) - RX600 Powered Operation Table

1.2 Instruction and Service Manuals should be readily accessible for reference prior to and when operating, cleaning and servicing the Operation Table. All manuals are available from Eschmann Equipment, see inside front cover for address details.

2. TECHNICAL DATA

DIMENSIONS

Table with standard table-top (Fig. 1):

Width including sidebars 560mm
Sidebars .....(31.75 x 6.35)mm
Overall length (with infill section) 1975mm
Minimum table height (without mattresses) 700mm
Maximum table height (without mattresses) . 1040mm

MOVEMENTS

Maximum Trendelenburg .....35°
Maximum Reverse Trendelenburg .....15°
Maximum Lateral Tilt (left and right).....15°
Maximum Extension .....210°
Maximum Flexion .....130°
Head section adjustment ..... ±45°

Note: With the table at minimum height, maximum Trendelenburg, and maximum head and leg section movements are reduced.

WEIGHT (nominal)

Table with standard table-top (Fig. 1) 300kg

SAFETY

The table is built to comply with BS5724 Part 1**,** BS5724 Part 2 Section 2.22, IEC601-1 and BS6859 Part 1. The mattresses comply with BS2891.

TABLE LOADING

The standard table (Fig. 1) satisfies a static load test in accordance with the requirements of BS5724.

WARNING

The RX600 has been designed for patients up to 135kg with their centre of gravity (normally the perineum) over the infill or trunk sections. Patient positioning and additional loads can compromise table stability. The perineal extension may be used to further offset the patient, however, always ensure loading does not compromise stability.

To comply with IEC601-1:1988 some accessories have been designed for a maximum evenly distributed load. For the divided-leg section this is 15kg per leg section (also see Publication T-IM49 issue 'b' or later) and 10kg for the detachable ophthalmic head-flap.

SYMBOLS & SAFETY CLASSIFICATIONS

Caution Refer to the accompanying documents, the "Instructions for Use".

or **IPX 4** indicates that the equipment will withstand a moderate quantity of fluid spilled from above.

Safety category

Indicates that the equipment is in safety category BF, i.e. it is manufactured to a safety standard which agrees with international regulations for medical electrical equipment, and provides a high degree of protection against electric shock. The symbol also indicates that the equipment will not be damaged by defibrillator discharge.

Indicates that the equipment is in safety category B, i.e. it is manufactured to a safety standard which agrees with international regulations for medical electrical equipment, and provides a minimum degree of protection against electric shock.

Class 2 Indicates that the built-in battery charger is designed to electrical protection Class 2.

Anaesthetic proof

Indicates that the parts of the equipment marked AP are designed for use within a distance of 5-25cm of a part of an enclosed medical gas system. BS5724 Part 1, 1989 refers.

Indicates that the parts of the equipment marked APG are designed for use within a distance of 5cm of a part of an enclosed medical gas system. BS5724 Part 1,1989 refers.

WARNING

The head section of this operation table is classified as 'EQUIPMENT not suitable for use in the presence of a flammable anaesthetic mixture with air or with Oxygen or Nitrous Oxide' and is NOT classified as 'Category AP Equipment' or 'Category APG Equipment' when it (the head section) is in its lowest position and the table top is in full Trendelenburg position.

Inspection

The table must be inspected at regular intervals, and if necessary, serviced, to ensure that it complies with all AP and APG requirements relevant to physical deterioration or breakage of electrical components, connections and cable insulation.

2. TECHNICAL DATA

Antistatic requirements

The table has an antistatic pathway from the table-top, through an internal resistor, to the castors, which are held in contact with the floor at all times.

CAUTION

1. To complete the antistatic pathway, the table must be used on an electrically conductive, or on an antistatic floor.

2. Always use purpose-designed Eschmann mattresses to maintain the antistatic pathway.

Electrical data

System power

Batteries:

Type ..... Two sealed lead-acid

Output (each) 12V 24Ah

Built-in battery charger:

Input ..... 100-120 / 200-240Vac 50/60Hz

Output ..... 27.6Vdc (nom) 3A (max)

System fuses:

Motor ..... 30A 1.5in. (AGU 30)

Base Control Board: (1) F6.3A 250V 20mm

(1) T2.5A 250V 20mm

(1) T2A 250V 20mm

CAUTION

This equipment contains environmentally hazardous lead-acid batteries. If the batteries fail, or if the equipment is to be disposed of, it is recommended that the batteries are taken to a disposal site designated for the disposal of lead-acid batteries, or that the batteries are collected by an agent who specialises in the collection of lead-acid batteries.

Hydraulic oil

Type ..... Eschmann RX (Part No. 699408)

3. SAFETY NOTES

Attention to the following points will prolong the life and efficiency of the RX600 Powered Operation Table and will help to avoid the risk of accidents, or damage.

DO:

- ⇨ Keep the Instruction for Use close-to-hand.
- ⇨ Read the instructions carefully before using table.
- ⇨ Check that the head and leg sections are secure, and put the table base in the braked position before use.
- ⇨ Disconnect the built-in battery charger from the power supply before washing the table.
- ⇨ Read and follow the instructions for cleaning, and for the care of the mattresses.
- ⇨ Use the correct mattresses and accessories.
- ⇨ Remove table accessories and their clamps (in particular rotary clamps) from sidebars, when they are not being used.
- ⇨ Ensure that the table and accessories are serviced at regular intervals (every 6 months is the recommended frequency) by Eschmann personnel only, or accredited agents.
- ⇨ Store the table as detailed in this manual.

DO NOT:

- ⇨ Lift the table by its table-top.
- ⇨ Push the table over rough surfaces, use a trolley.
- ⇨ Drop the table (or individual sections).
- ⇨ Put heavy weights on the table sections.
- ⇨ Put sharp objects on, or against, mattresses, pads, or the radiographic table-tops.
- ⇨ Drop heavy objects onto the radiographic table-tops.
- ⇨ Spill oil, ether, or other fluids onto the mattresses or the pads.
- ⇨ Pull the table by any of the table-top sections, always push it.
- ⇨ Hold or support the leg section by its black radiographic top, as this is a removable item and might come off.

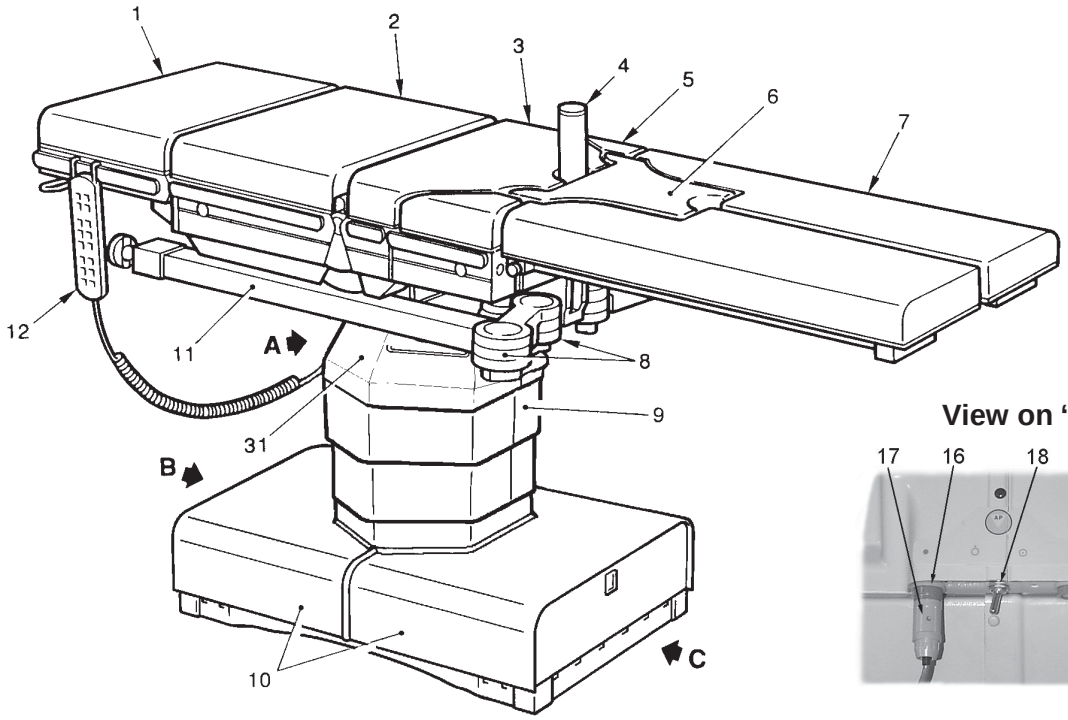
Note: The table cannot be used (under normal circumstances) with table base stand-by door open.

WARNING

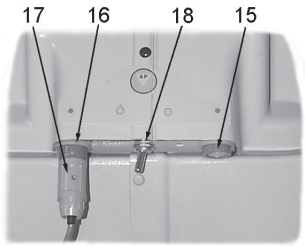
The RX600 Powered Operation Table has been designed to minimise the possibility of accidental electrosurgery burns. Contact with any metal surfaces (e.g. table side bars, or other equipment etc.) can cause burns during electrosurgery and must be avoided.

With the table in (or during transition into) the castor position, the centre of gravity of the patient (normally the perineum) should lie no more than 200mm away from the centre of the column (i.e. no more than the length of the short trunk section). Whenever this is not practical the overhanging weight of the patient and table should be adequately supported (e.g. by at least two able people). Also see Warnings in the Instruction for Use and within the text of this publication.

4. INTRODUCTION

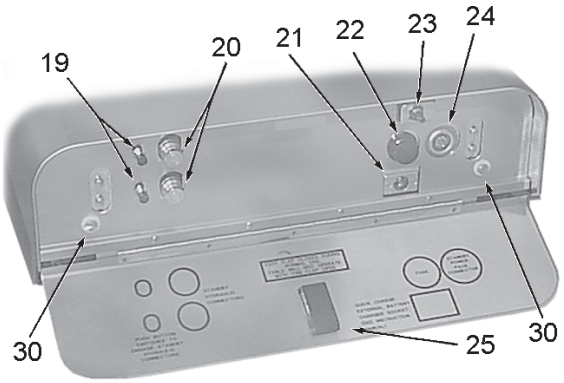


View on 'A'



1. Head section
2. Long trunk section
3. Short trunk section
4. Perineal post
5. Hip section
6. Sacral extension
7. Pre-traction leg section
8. Traction beam swivel joints
9. Column cover
10. Table base covers
11. Traction beams
12. Hand control
15 Hand control/Footcontroller socket
16 Hand control/Footcontroller socket
17 Hand control plug
18 Table 'on/off' switch (⊙ = on, ◯ = off)
19 Standby hydraulic power-pack pushbuttons
20 Standby hydraulic power-pack connectors
21 External battery charger socket
22 High current 30A Fuse
23 Door microswitch
24 External power-pack connector
25 Standby door
26 Internal battery charger socket
27 Internal battery charger 'on' indicator
28 Internal battery charger door
29 Removable mains lead
30 Cover retaining screws
31 Top of column covers

View on base long trunk end



View on base short trunk end

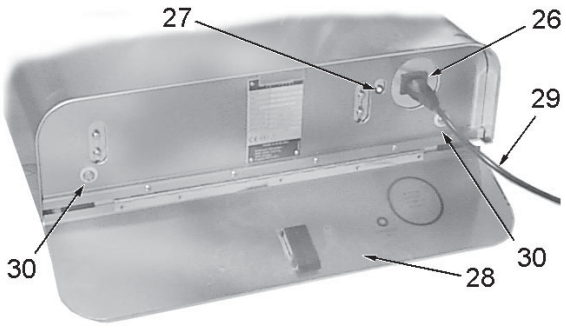


Fig. 1 RX600 Powered Operation Table

4. INTRODUCTION

GENERAL

4.1 This Service Manual contains a technical description and maintenance procedures for the RX600 Powered Operation Table as shown in Fig. 1.

4.2 The table is a battery powered, mobile, orthopaedic, and trauma table with two integral articulated telescopic traction beams, which stow under the table-top when not in use. The beams are extended for use, and are used in conjunction with traction accessories. The table-top comprises pre-traction leg supports, and head, hip, long and short trunk sections.

4.3 The table can be used as a general purpose five-section Operation Table, by fitting optional infill sections, and an optional leg section, in place of the pre-traction leg supports. The table design allows a full range of orthopaedic and trauma surgical procedures to be carried out, including pin and plate femur and tibia nailing, and arm traction.

4.4 The table is operated by electrical/electronic circuits, which control the position of hydraulic cylinders (via electro-hydraulic valves) in response to signals from a touch-button hand control, or from an optional footswitch. The hand control and the footswitch both plug into connectors at the top of the table column.

4.5 Power is provided by two 12V sealed lead-acid batteries in the table base. The 12V batteries are connected in series to give an output voltage of 24V. Trickle charging for the batteries is provided by an inbuilt battery charger, provision is also made for connection of an external battery charger for quick battery charging. Connection of the inbuilt battery charger to the mains electrical supply is via a removable cable which plugs into the table base.

4.6 All table top trunk movements are electrically controlled using either the hand control or, as an optional accessory, the footswitch which is used by the surgeon during certain procedures for height and Trendelenburg control.

4.7 The main operation table sections are:

- ⇨ Base.
- ⇨ Central column.
- ⇨ Head section.
- ⇨ Long and Short trunk sections.
- ⇨ Hip section.
- ⇨ Sacral extension.
- ⇨ Pre traction leg section.
- ⇨ Traction accessories.

NOTE: Instruction and Service manuals should he readily accessible for reference prior to, and when operating, cleaning and servicing the table.

ELECTRICAL SYSTEM

NOTE: Electrical/electronic circuit diagrams are provided at the end of this Manual in section 6.

Main control board

4.8 The main control board receives signals from the hand control via an RS485 serial communication link. The board also receives signals from the footswitch, table-base cover switches, levelling microswitches, level tilt switch, opto board, standby unit socket, door switch, traction beam opto sensors and table base on/off controls.

4.9 Outputs from the main control board pass to the hand control via an RS485 serial communication link, to the hydraulic solenoids via the top-of-column distributor and solenoid boards, and to the base distributor board and FET-Relay board for motor on/off control and motor direction control. The main control board is supplied with 24V d.c. from the batteries and generates its own 12V d.c. and 5V d.c. supplies.

4.10 The principal functional areas of the main control board are:

- ⇨ Input buffering (pull-up and pull-down resistors and capacitors).
- ⇨ The microcontroller, which uses software to implement table control functions.
- ⇨ Output buffering (current drivers and level shifters).
- ⇨ Motor direction drive and on/off control.

Height opto board

4.11 The height opto board is fitted at the base of the column in a fixed position relative to the baseplate. It responds to a metal reflector plate which moves up and down with the column chassis and hence with the table top. When the reflector moves in front of the three reflective opto sensors (only two are used) electrical signals are generated to signal to the main control board that the table is at or above 'minimum height', or in the 'castor' position.

4.12 When the reflector plate is in front of reflective opto coupler 01 and at the correct distance from it, a signal is produced which passes via J1 on the opto board and the 10-way ribbon cable to J22 on the main control board.

4.13 When the reflector plate is in front of both reflective opto couplers 01 and 03 signals from both pass to the main control board which stops the table movement at the correct position.

4. INTRODUCTION

Base distribution board

4.14 This board receives signals from the main control board for the height (extend) solenoid, the height (contract) solenoid, the pump-isolate (forward) solenoid and the pump-isolate (reverse) solenoid.

4.15 The board also passes signals to the main control board from the cover microswitches.

4.16 Any inductive overswings from the solenoids are blocked by diodes Dl to D4. PL7 on the base distribution board is connected via a 14-way ribbon cable to J4 on the main control board.

Top-of-column distribution board

4.17 This board connects to J2 on the main control board via a 34-way retractable ribbon cable which terminates on PL1 of this board. It distributes signals to 10-way hand control/footswitch sockets PL2 and PL3, and to:

- ⇨ the level tilt switch via PL7
- ⇨ the Trend level position microswitch via PL5
- ⇨ the lateral tilt opto board via PL4
- ⇨ the break level position microswitch via PL6
- ⇨ top-of-column solenoids board via PL8
- ⇨ the on/off switch via PL9
- ⇨ proximity sensors on long trunk via J10/11/12.

Top-of-column solenoids board

4.18 This board receives signals on J7 via a 10-way ribbon cable from J8 on the top-of-column distributor board to drive the top-of-column solenoids via cage clamp connectors J1 to J6. It also blocks inductive overswings from solenoids using diodes D1 to D6.

Tilt opto board

4.19 The tilt opto board is fitted at the top of the column in a fixed position relative to the yoke. It responds to a metal plate which moves with the yoke and hence with the table top. When the reflector moves in front of the opto sensors electrical signals are generated to signal the main control board that the table is level.

4.20 When the reflector plate moves in front of the opto sensor, a logic signal 0 is produced which passes via J1 on the opto board to the top of column distribution board and then via a 10-way ribbon cable to J2-4 on the main control board.

4.21 When the reflector plate is not in front of the opto sensor, a logic signal 1 is produced which is passed to the main control board as above.

Power circuits

4.22 The power source for the table is two 12V, 24Ah sealed lead acid batteries connected in series. A 30A in-line, high current fuse protects the batteries, motor, FET relay board and interconnections.

4.23 Current from the batteries passes via the reversing relay, where it is switched by the FET's, and then passes to the pump motor and returns to the batteries. The 24V d.c. supply is also routed to the hydraulic solenoids and the main control board.

Hand control

4.24 The RX600 hand control communicates with the main control board via an RS485 serial communication link. The hand control contains a microcontroller which receives inputs from the hand control buttons and generates outputs which go to the hand control LED's and the hand control audible warning device. The microcontroller uses software to implement hand control, control functions.

4.25 The hand-control incorporates a 2-digit display that indicates a code if a problem should occur. Such problems could be the result of the user pushing a button in the wrong sequence or at the wrong time or of a system failure (see Table 1 - Fault Diagnosis, Table 2 - Codes for 2-Digit display and Fig. 31)

Footswitch (optional accessory)

4.26 The footswitch plugs into either of the two 10-way sockets used by the hand control. It uses the same +5V d.c. and 0V pins, but the signal lines are different from those of the hand control. The footswitch does not use a serial communication link.

4.27 There are four functions on the footswitch:

- ⇨ Height up.
- ⇨ Height down.
- ⇨ Trendelenburg.
- ⇨ Reverse Trendelenburg.

4.28 Each of these four functions is associated with two microswitches mounted inside the body of the footswitch, one normally open and the other normally closed. The normally open microswitch for each function is connected on one side to the +5V d.c. line and on the other side to a common 'alarm' line. The normally closed microswitch for each function is connected on one side to the 0V line and on the other side to an individual input line on the main control board. If, for any function of the footswitch, e.g. height up, the normally open microswitch operates and the normally closed microswitch does not, or vice versa, the main control board will recognise a fault and freeze the table. The likelihood of two microswitches failing at the same time is very remote.

4. INTRODUCTION

Table base ON/OFF control

4.29 The table is switched 'on' and 'off' by selecting ⊙ and ◯ respectively. When switched 'on', 24V d.c. is switched directly to the main control board. When it is switched 'off' the main control board is isolated from the 24V d.c. supply. To isolate the system the 30Amp fuse should be removed.

Built-in battery charger

4.30 This is a internal low current output 'trickle' charger, which replenishes an average day's table use of the batteries with an overnight charge.

4.31 The mains input comes via the mains lead, which should be fitted with a fused plug. The output of the charger is regulated to provide 27.6V d.c. to the batteries for float charging. This voltage will fall when the batteries are not completely charged and hence are drawing a significant current. The charger has short-circuit and thermal protection. There is an output from the board which supplies current to the batteries, an output to the 'trickle' charger indicator LED and an input from the external charger. Current from either the internal or the external charger is routed to the batteries via the 'trickle' charger board.

External battery charger (optional accessory)

4.32 The external battery charger plugs into the external battery charger socket in the table base and supplies current via the 'trickle' charger board to fast-charge the batteries.

Standby system connections

4.33 An RX Standby Unit (optional accessory) which provides standby hydraulic and electrical services, can be connected to the RX600 table via hydraulic connectors and an electrical socket behind a door on the table base.

4.34 Next to the hydraulic connectors are two push-buttons which release stored hydraulic pressure when the standby hydraulic connections are first made. This is done by energizing the pump forward and reverse solenoids with power from the standby unit.

4.35 To connect the standby unit to the table it is necessary to open the base door. This operates a microswitch which disconnects the main control board solenoid control circuits from the solenoids so that they can be controlled by the standby unit, also the pump motor is hydraulically isolated from the hydraulic solenoids. The electrical signals from the standby socket pass to J1 on the main control board (15-way D-connector).

Traction beam stowage detection

4.36 Proximity sensors fitted in the underside of the long trunk section detect the traction beams when they are in their stowed position. The sensors signal the table control system to stop the table top being driven down onto the stowed traction beams.

5. DESCRIPTION

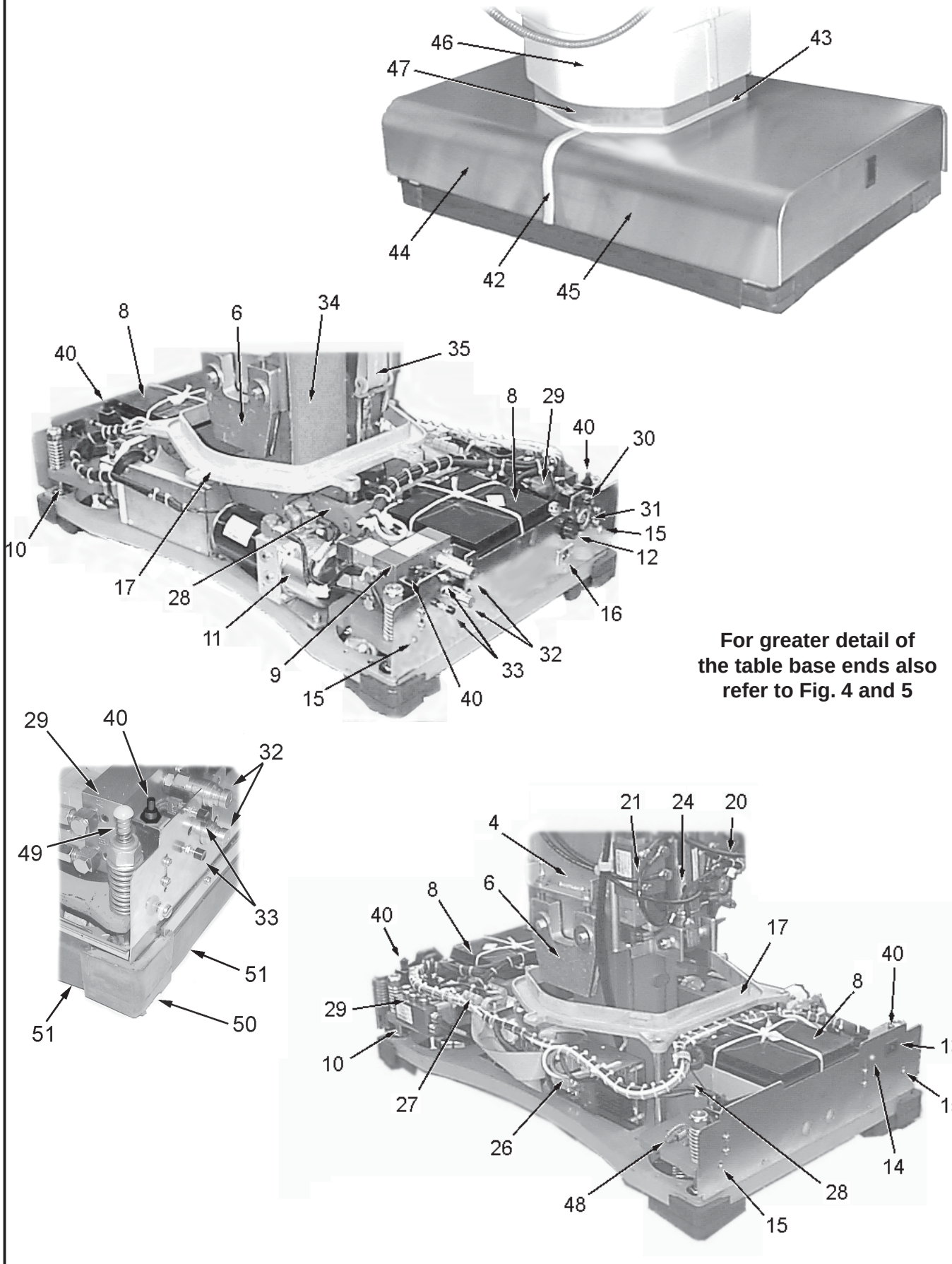


Fig. 2 RX600 Operation Table : Base details, covers on and off

5. DESCRIPTION

Key to Figs 2 and 3

1. Long trunk assembly
2. Short trunk assembly
3. Lateral tilt cylinder
4. Wrap around
5. Trunk assembly plastic covers
6. Wedge
7. Outer column
8. Battery
9. Manifold block No 1
10. Castor plate guide pillar
11. Hydraulic power unit
12. High current fuse, 30A
13. Mains socket
14. Battery charging LED (green)
15. Cover retaining screw location
16. External battery charger socket
17. Drip gutter
18. Opto reflector plate
19. Inner column
20. Manifold block No 4
21. Manifold block No 3
22. Upper bezel
23. Hand control and cable
24. Trendelenburg cylinder
25. Break cylinders
26. Main control PCB
27. Base distribution PCB
28. Castor frame assembly
29. Manifold block No 2
30. Door microswitch
31. Standby power pack connector
32. Standby hydraulic connectors
33. Push buttons to engage standby hydraulic connectors
34. Hydraulic reservoir
35. Ribbon cable reel assembly
36. Top-of-column distribution PCB
37. Hinge
38. Lateral tilt opto board
39. Yoke
40. Cover microswitch
41. Table ‘on/off’ switch
42 Base seal
43. Column seal
44. Short trunk base cover
45. Long trunk base cover
46. Telescopic column cover
47. Column upstand
48. Antistatic discharge path resistor
49. Base cover spring support
50. Base foot
51. Base skirt
52. Traction arm selector knob
53. Traction handle
54. Swivel joint, knuckle
55. Traction arm
56. Hip section
57. Swivel joint locking knob

5. DESCRIPTION

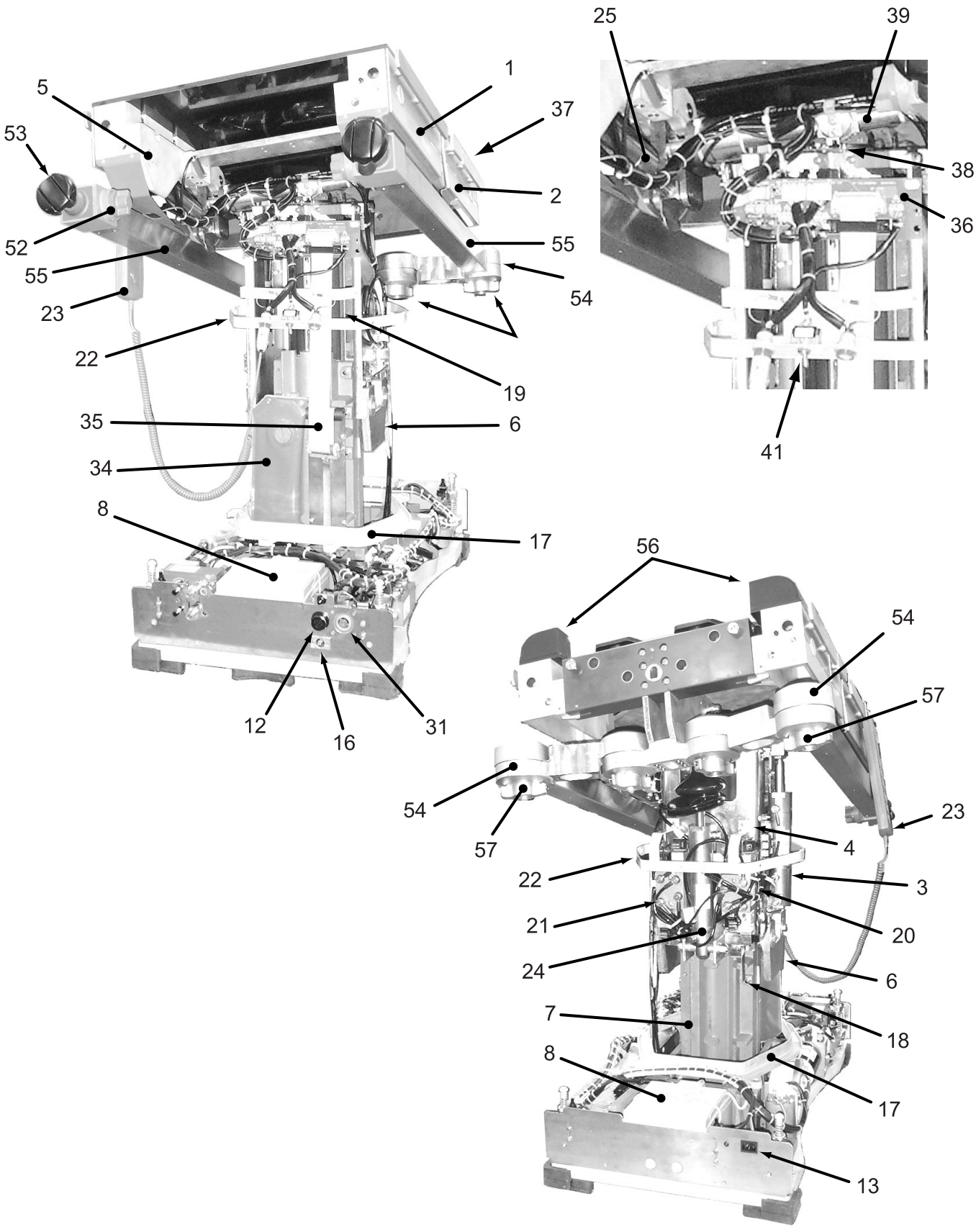
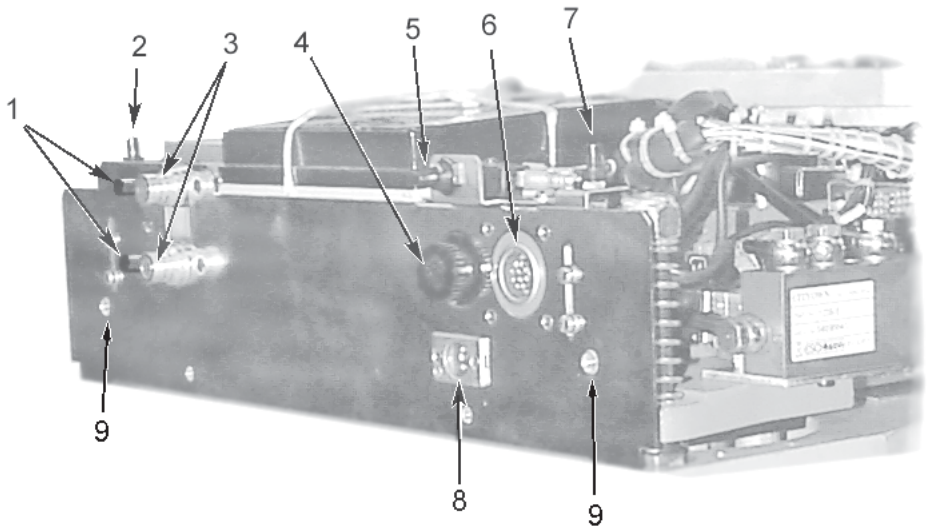


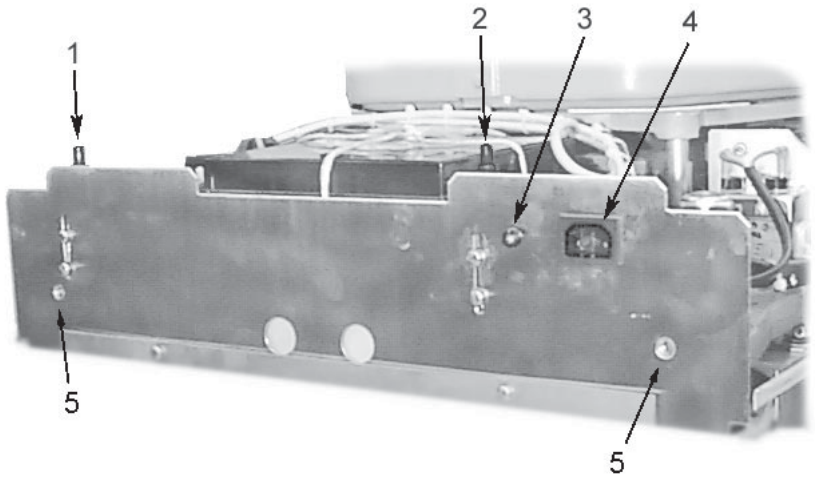
Fig. 3 RX600 Operation Table : Column and trunk section detail

5. DESCRIPTION



1	Standby hydraulic push buttons
2	Base cover microswitch
3	Standby hydraulic connectors
4	High current (30A) fuse
5	Door Microswitch
6	Standby power pack connector
7	Base cover microswitch
8	External battery charger socket
9	Fixing for cover retaining screw

Fig. 4 RX600 Operation Table base detail (long trunk end)



1	Base cover microswitch
2	Base cover microswitch
3	Mains charging LED
4	Mains connection socket
5	Fixing for cover retaining screw

Fig. 5 RX600 Operation Table base detail (short trunk end)

6. MAINTENANCE

GENERAL

6.1 Maintenance of the RX600 Powered Operation Table falls into the following categories:

Cleaning and storage.
General care and lubrication.
Functional checks.
Hydraulic system.
Adjustments.
Removal and Installation.
Fault diagnosis.

CLEANING AND STORAGE

WARNING
Always switch off table at table 'ON/OFF' switch (item 18, Fig. 1) prior to cleaning.

6.2 For cleaning and storage instructions refer to RX600 Powered Operation Table Instruction for Use (Publication No. T-IM33 issue 'd' or later).

6.3 For cleaning and storage instructions of the table accessories refer to the Accessory Instructions for Use (Publication No. T-IM56).

Note: If the table is to be stored for any length of time the head and leg sections should be fully lowered. This is necessary to ensure that the gas spring seals and pistons are kept fully lubricated.

GENERAL CARE AND LUBRICATION

6.4 Once a week proceed as follows:

Gas Springs

WARNING
The gas springs are filled with high pressure gas. Do not attempt to open them.

CAUTION
Gas springs MUST NOT be additionally lubricated.

6.5 The gas spring supports for the head section are sealed units which require no routine maintenance. Malfunction of a gas spring makes it impossible to lock the head section in position. Seepage of fluid indicates a failing unit.

6.6 If a gas spring is faulty, the complete unit must be renewed, gas springs are non-repairable items (see section 6.44).

Head, hip, pre-traction leg support and alternative leg sections, and sacral extension

6.7 Service the head, hip, and pre-traction leg support sections, and sacral extension as follows:

i Apply a smear of light machine oil to the guide pins and pivot pins on the head, hip, and pre-traction leg sections, and the Sacral extension.

ii Examine all sections, and the sacral extension for signs of damage, particularly for scoring or bending of the attachment guide pins. On the head and alternative leg section, examine the release handle for signs of damage.

iii Check the guide pin retaining screw for tightness.

iv On the head and alternative leg section, check the hinge and gas spring pivots for security (grub screws or starlock washers, whichever fitted), particularly the main hinge pivot pin. (Note that the grub screw for the main hinge pivot pin is underneath the radiographic top.)

v Check the side bars for security.

vi Examine the guide pin locking button on the hip, and pre-traction leg support sections, and the release latch on the Sacral extension for damage. Apply a smear of light machine oil to all moving parts.

vii On the infill section, examine the guide pin locking button devices for damage and ensure that the mechanism, which prevents removal of the infill section before any attached section has been removed, functions correctly (refer to section 6.49). Apply a smear of light machine oil to all moving parts.

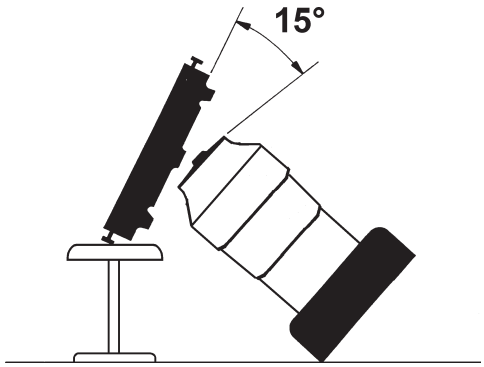


Fig. 6 Table tilted for access to underside

Head and hip sections, locking mechanisms

6.8 Remove the head, hip and sacral extension sections from the table and clean out any collected fluff or other debris from guide pin sockets in the ends of the trunk sections, in the sacral extension attachment and location holes in the crossbeam. Spray a little aerosol lubricant into each socket and attachment hole. Check the operation of the locking mechanisms when re-attaching the sections (for adjustment refer to section 6.50).

Long and short trunk sections

6.9 Service the long, and short trunk sections as follows:

i Apply a smear of light machine oil to the pivot pins on the long and short trunk sections.

ii Examine the guide pin button locking devices for damage (for adjustment refer to section 6.50). Apply a smear of light machine oil to all moving parts.

6. MAINTENANCE

Radiographic tops

6.10 Examine the radiographic tops for cracks, chips and scoring. Significant damage will necessitate replacement of the damaged section. Make sure that the radiographic tops are securely attached (not applicable to the optional leg section).

Underside of the table base

6.11 To maintain the underside of the table base, it is necessary to tilt the table onto its side as follows:

i If necessary, remove head, and pre-traction leg and support sections or the leg and infill section accessories.

ii Using the hand control, raise the table to its maximum height and make sure that the long and short trunk sections are level.

iii Using the hand control, set the table top to the maximum lateral tilt position corresponding to the direction in which the table is to be tilted (see Fig.6).

iv Place an anaesthetist's stool, or a similar strong support, along one side of the table (see Fig.6). With two people standing on the same side of the table as the support (one at each end), tilt the table over and gently lower it onto the support, making sure that it rests on the side bars of the long and short trunk sections.

6.12 With the table in the tilted position, proceed as follows (see Fig.7):

i Examine the five base feet for damage or excessive wear. If necessary, replace the appropriate base feet as described in sections 6.47 and 6.48.

ii Clean each castor assembly making sure that they are free of dust and debris. Lubricate the bearings of each castor and the directional wheel with a light machine oil.

iii On completion, return the table to the upright position.

Traction beam attachment

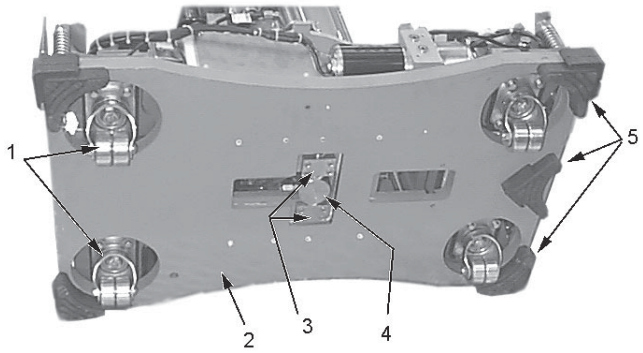
6.13 Routine maintenance of the beam attachment consists of checking for secure attachment of the beam as follows:

i Remove the two locking socket set screws (items 1, Fig.8) from the underside of the beam.

ii Two socket dog point set screws under the two locking socket set screws removed in (i) above can now be checked and tightened.

iii Replace and tighten the two locking socket set screws removed in (i) above.

iv Check and tighten the slotted countersunk screw (item 2, Fig. 8).



1 Castor assembly
2 Table base plate
3 Height cylinder pivot clamp blocks
4 Height cylinder
5 Base feet

Fig. 7 Underside of table base

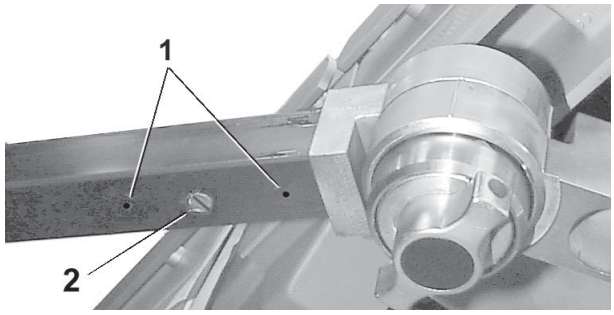


Fig. 8 Adjustment of beam attachment

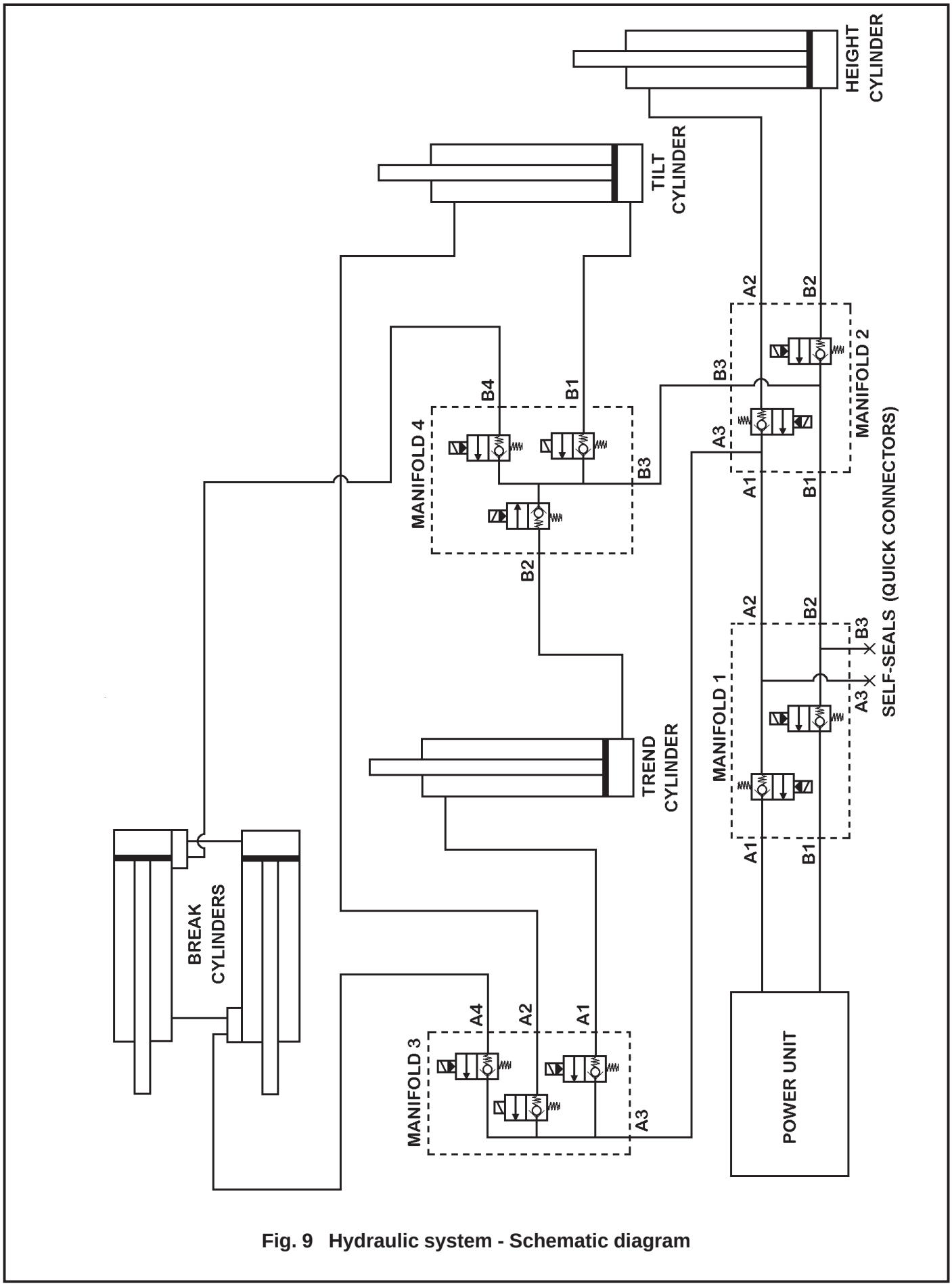
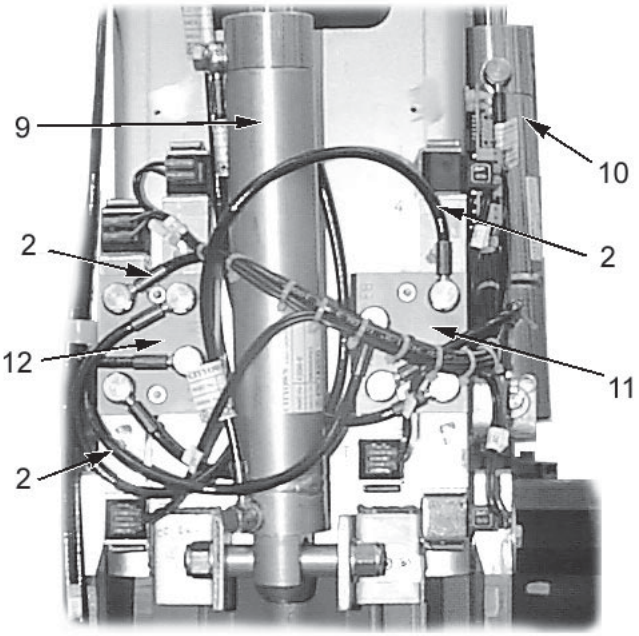
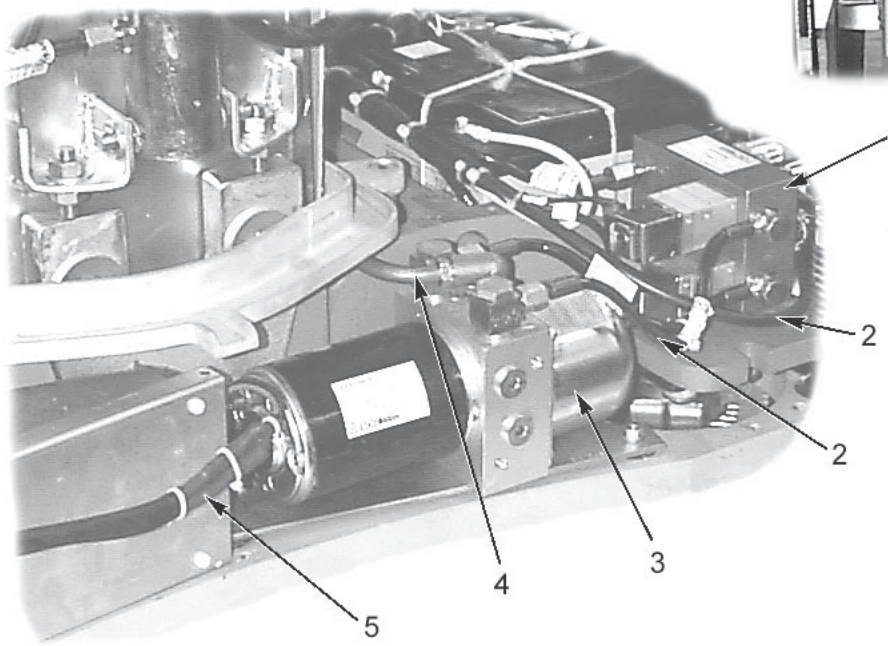


Fig. 9 Hydraulic system - Schematic diagram

6. MAINTENANCE

1	Manifold 1
2	Hydraulic connections
3	Power unit
4	Feed from reservoir
5	Power unit electrical lead
6	Base distribution board
7	Base control board
8	Manifold 2
9	Trendelenburg cylinder
10	Tilt cylinder
11	Manifold 4
12	Manifold 3





For break cylinders see Fig.18 and for height cylinder see Fig.22. The lateral tilt cylinder is also shown in greater detail in Fig.19.

Note: Hydraulic cylinder rams are retracted when the table top is positioned as follows, but care must be taken when moving the table into this position to avoid damage, sections will be very close to the floor :

Minimum height and onto castors.
Maximum extension achievable at the minimum height set above.
Maximum tilt achievable with table at the minimum height and extension set above (tilt table such that the right hand side is lowered when viewed from short trunk end of table).

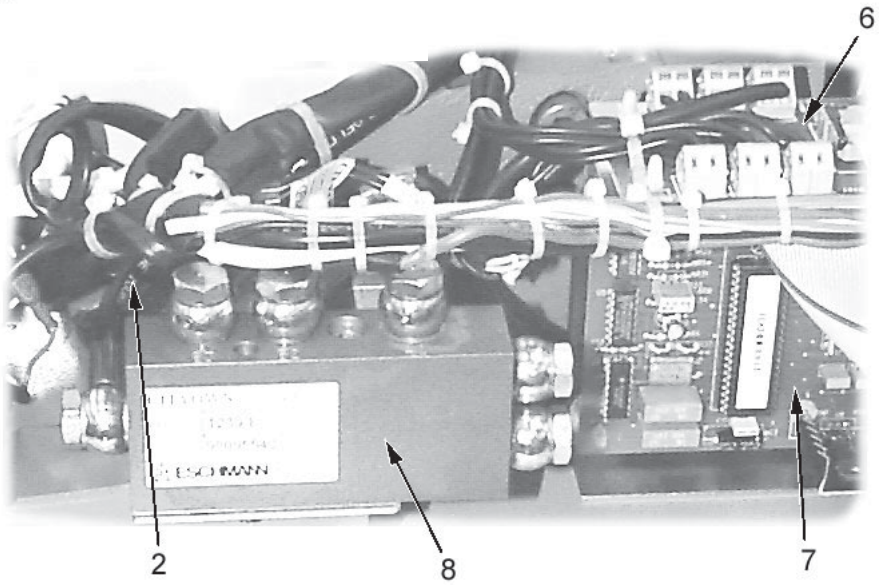
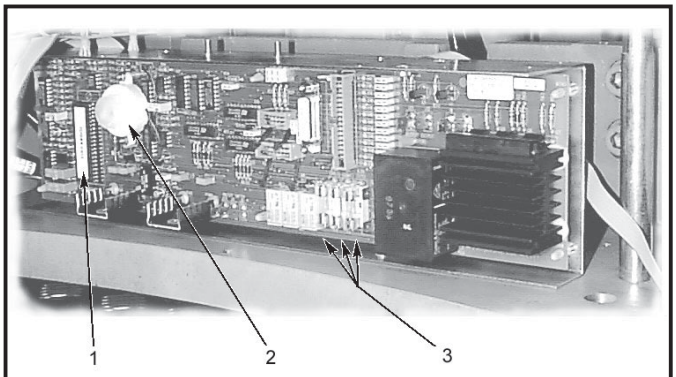


Fig. 10 Hydraulic system - main components

6. MAINTENANCE

Access to fuses

6.14 The high current 30A mains fuse is fitted in the table base standby panel (item 4, Fig. 4). The three other fuses for the operation table are fitted on the main PCB (item 3, Fig.11) in the base of the table. To get to them remove the base covers as described in section 6.26. The installation of the base covers is described in section 6.27.



1 Programmed microcontroller
2 Beeper
3 Fuses

Fig. 11 Main control board

Hand control

6.15 The factory sealed hand control requires no maintenance. If a fault is suspected in the hand control first test all table functions using a hand control known to be fault free. If a fault is confirmed with the hand control the complete assembly (including lead and plug) should be replaced (see Fig.31 for details of hand control function).

After maintenance

6.16 After maintenance on the operation table, always check all functions (section 6.17) and lower the table fully.

FUNCTIONAL CHECKS

General

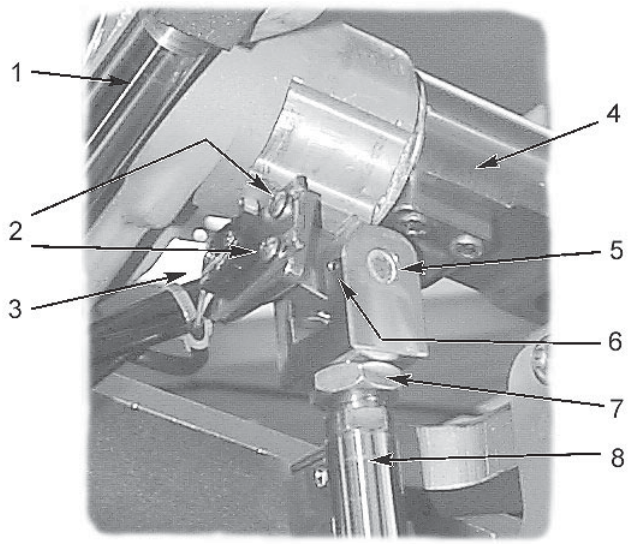
6.17 The following functional checks should be carried out after maintenance of the operation table, or after rectification of any faults:

i Refer to Manual T-IM33 issue 'd' or later, and check the state of batteries using the hand control, codes 01 and 02 should not be displayed. If they are the table batteries need recharging.

ii Using the hand control, check that all table movements agree with the Technical Data.

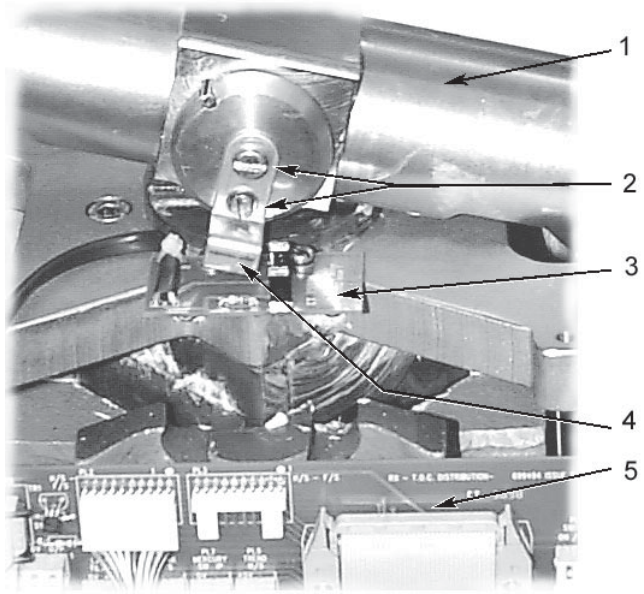
iii Using the foot control unit (optional accessory), check that the table movements are correct for Trendelenburg, Reverse Trendelenburg, and Height.

iv Use hand control to check operation of the 'auto level' function.



1 Break cylinder
2 Microswitch adjusting screws
3 Trendelenburg microswitch
4 Yoke
5 Pivot pin
6 Pivot pin set screw
7 Tilt cylinder ram lock nut
8 Tilt cylinder ram

Fig. 12 Trendelenburg microswitch



1 Yoke
2 Adjusting screws
3 Lateral tilt opto board
4 Lateral tilt opto flag
5 Top of column distribution board

Fig. 13 Lateral tilt opto detail

6. MAINTENANCE

HYDRAULIC SYSTEM

CAUTION

Scrupulous cleanliness is essential to prevent contamination of the fluid in the hydraulic system.

Notes:

1 Use only Eschmann RX hydraulic oil, Part No.699408, which is obtainable from Eschmann Equipment or their accredited agents. Replace cap on oil container after use.

2 When replacing hydraulic components all Banjo fittings must be tightened to a torque setting between 19 and 21 Nm.

3 The hydraulic system schematic diagram is shown in Fig. 9 with the main components illustrated in Fig. 10. Individual cylinders are also shown in the 'Removal and Installation' section later in the manual.

General

6.18 If the table cannot be placed into the castor position using the hand control, it may be necessary to manually raise the table base. To raise the table base, proceed as follows:

i Remove table base covers, see section 6.26

ii Locate the jacking nut at each corner of the table base (see Fig.26, item 1) and wind the nuts down evenly to raise the table base.

Topping-up the hydraulic reservoir

6.19 Top-up the hydraulic reservoir as follows:

i Set table to an appropriate height and remove base covers as described in section 6.26.

ii Release the central column cover and remove the upstand as described in section 6.30.

iii Retract all cylinder rams before filling reservoir so that the true oil level can be established (see Note in Fig. 10). Overfilling could damage the reservoir.

iv Remove the filler cap from the hydraulic reservoir and fill the reservoir with Eschmann RX hydraulic oil until oil level is 13 mm below the filler hole of the reservoir.

v Refit the filler cap on reservoir.

vi Refit the central column cover and upstand as described in section 6.31.

vii Refit the base covers as described in section 6.27.

ADJUSTMENTS

Trendelenburg (Trend) microswitch

6.20 To check and adjust the Trendelenburg microswitch (item 3, Fig. 12) proceed as follows:

i Ensure the table is on a level surface.

ii Using the hand control, move the table top to the maximum Trendelenburg position.

iii On the hand control, press the 'auto level' button and wait until the table top stops when level.

iv Using an inclinometer (on section radiopaque top not the mattress), check the angle of the short trunk section in the horizontal plane.

v If the angle is more than one degree out in either direction adjust the Trendelenburg microswitch as necessary, by releasing the adjusting screws (item 2, Fig.12) and moving the microswitch in the appropriate direction, retighten the adjusting screws.

vi Repeat steps 'ii-v' until the short trunk section stops level.

Lateral tilt opto

6.21 To check and adjust the lateral tilt opto flag (item 4, Fig.13) proceed as follows:

i Ensure the table is on a level surface.

ii Using the hand control, tilt the table top to the maximum lateral tilt position (left or right).

iii On the hand control, press the 'auto level' button and wait until the table top stops when level.

iv Using an inclinometer (on section radiopaque top not the mattress), check the angle of the table top in the lateral plane.

v If the angle is more than one degree out in either direction adjust the flag (item 4, Fig.13) for the lateral tilt opto by releasing the adjusting screws (item 2, Fig.13) and moving the flag in the appropriate direction, retighten adjusting screws.

vi Repeat steps 'ii-v' until the table stops level.

Break microswitch

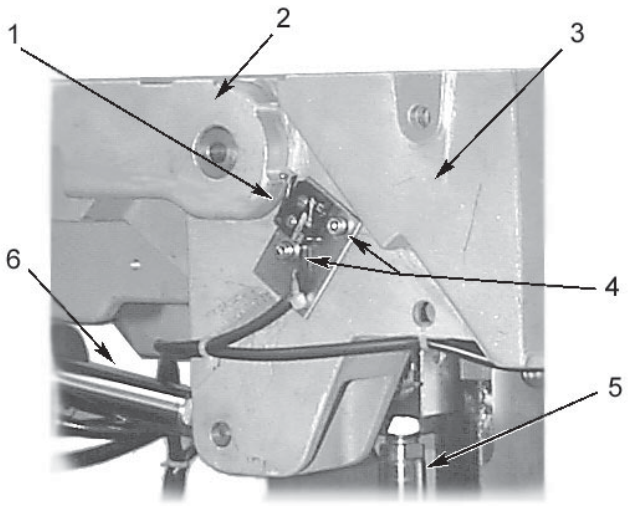
6.22 To check and adjust the break microswitch (item 1, Fig. 14) proceed as follows:

i Ensure the table is on a level floor.

ii On the hand control, press the break (extension) button and move the table top to the maximum break (extension) position.

iii On the hand control, press the 'auto level' button and wait until the table top stops when level.

6. MAINTENANCE



1 Break microswitch
2 Long trunk assembly
3 Short trunk assembly
4 Adjusting screws
5 Tilt cylinder ram
6 Break cylinder ram

Fig. 14 Break microswitch

iv Using an inclinometer (on section radiopaque top not the mattress), check that the short trunk section is level, if it is not adjust the Trendelenburg microswitch as detailed in section 6.20.

v Using an inclinometer (on section radiopaque top not the mattress), check the angle of the long trunk section.

vi If the angle is more than one degree out in either direction adjust the break microswitch by releasing the adjusting screws (items 4, Fig.14) and moving the microswitch in the appropriate direction, retighten the adjusting screws.

vii Repeat steps 'ii-vi' until the long trunk section stops level.

Level tilt switch

6.23 To adjust the level tilt switch (item 4, Fig.15) proceed as follows:

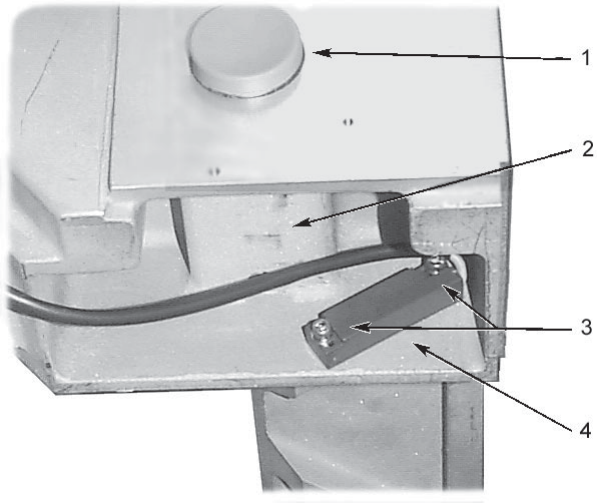
i Ensure the table is on a level floor.

ii On the hand control, press the 'auto level' button and wait until the table top stops when level (check the long and short truck sections are level in both directions and adjust if required as detailed in sections 6.20 to 6.22).

iii On the hand control, press patient right orientation button (button 2, Fig.31).

iv On the hand control, press the Trendelenburg button (button 3, Fig.31) and move the table top to the maximum reverse Trendelenburg position.

v Using an inclinometer (on the radiopaque top not the mattress of the short trunk section), check the angle of the table top. The angle should be 35 degrees.



1 Push button
2 Short trunk assembly
3 Adjusting screws
4 Level tilt switch

Fig. 15 Level tilt switch

vi On the hand control, press the break (extension) button (button 5, Fig.31) and check for movement of the long trunk section of the table top. If movement occurs, adjust the level tilt switch by releasing the adjusting screws (item 3, Fig.15) and moving the level tilt switch in the appropriate direction to stop any movement of the long trunk section with the table top in the reverse Trendelenburg position.

vii After adjusting the level tilt switch repeat actions (iv) (v) and (vi) until there is no movement of the long trunk section in the maximum Trendelenburg position.

6. MAINTENANCE

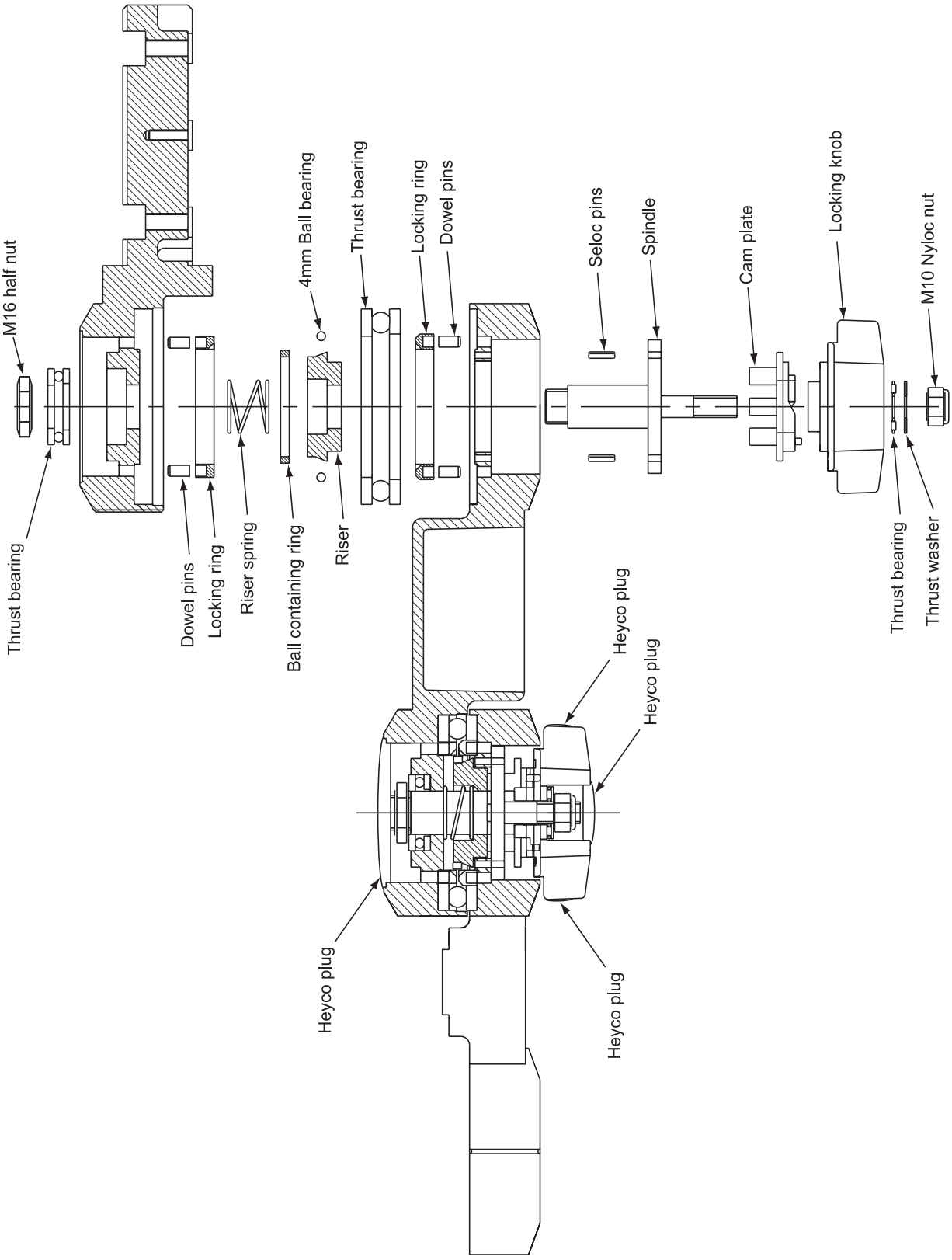


Fig. 16 Swivel joint detail

6. MAINTENANCE

Traction beam swivel joints

CAUTION

Never force a locking knob as this may cause damage, if it is too tight it needs to be adjusted. Never lubricate the 4mm ball bearings, ball retaining ring, riser, or the locking rings, as this will impair function.

6.24 The traction beam swivel joints should lock in position when the locking knob is turned about 1/2 turn clockwise. If they do not, adjust each one as follows:

i Refer to Fig.16 and remove the bottom "heyco" plug and unlock the locking knob.

ii If the locking knob can be locked throughout the whole movement range without resistance, tighten the M10 self locking nut until some resistance to locking becomes evident.

iii Find the tightest position to lock the knuckle being adjusted, by rotating it through its complete range of movement and checking at each 10° position by turning the locking knob to the locked position and back again. With the knob in this position slacken the M10 self locking nut and then adjust (tighten) to 3.4N-m (30lb-in). **Do not** over tighten.

iv Check the locking function, it should not be difficult at any position. Check for any free lateral movement with the link beam in its 'parked' position and the extending beam swung 180° out from its 'parked' position. When locked, the total maximum lateral movement of each beam assembly, should not exceed 46mm at the end of the retracted beam. If adjustment is still not satisfactory it may be necessary to change some or all of the 'loose' parts within the swivel joint. Guidance on this procedure is given in section 6.55.

v Refit the heyco plug when adjustment is completed.

REMOVAL AND INSTALLATION

General

6.25 All equipment in the base of the operation table is accessible after the base covers have been removed (see section 6.26). To get to equipment located around the central column it is necessary to remove the top-of-column covers (see section 6.28) and release the central column cover (see section 6.30).

Remove table base covers

6.26 To remove the table base covers proceed as follows:

i Open doors at the ends of the table base, see Fig. 1.

ii At the short trunk end of the table base:

(a) Remove two screws (item 30, Fig.1) and shouldered washers and pull the short trunk end base cover (item 45, Fig. 2) from the base.

iv At the long trunk end of the table base:

(a) Remove the two black button covers from the standby hydraulic push buttons (item 1, Fig.5) by gently pulling them off.

(b) Remove two screws (item 30, Fig.1) and shouldered washers and pull the long trunk end base cover (item 44, Fig. 2) from the base.

v Remove the two base seals (item 42, Fig. 2). The column seal (item 43, Fig. 2) can remain in place on the upstand unless access is required to the lower column (see section 6.30).

Note: When the hinged cover at the long trunk end of the table is opened, or when the base cover is removed, a microswitch operates to isolate the electrical supply to the table. To operate the table with this cover removed, the microswitch must be taped in the operated position.

Install table base covers

Note: Before replacing covers check that all cables and hydraulic pipes are secured and that they cannot be pinched, chaffed or cut by any moving parts.

6.27 To install table end base covers proceed as follows referring as required to Fig.1 and 2 :

i Check that all tools and discarded equipment have been removed from inside table base before installing base covers.

ii To install the long trunk end base cover:

(a) Press the two springs at the long trunk end of the base and locate the long trunk base cover in the slide rails along the sides of the base.

(b) Push the end cover fully home and secure with two screws and shouldered washers, finally replace the two push button covers.

iii To install the short trunk end base cover proceed as follows referring as required to Fig.1 and 2 :

(a) Press two springs at the short trunk end of the base and locate the end cover in the slide rails along the sides of the base.

(b) Push the end cover onto the base until it is approximately 3 to 4 mm from the long trunk end base cover.

(c) Push two base seals into position between the end base covers, and push the short trunk end base cover fully into position. Secure the short trunk base cover using two screws and shouldered washers.

(d) If removed, replace the column seal onto the upstand, it may be necessary to leave the seal to contract after initial assembly before butting the edges together, **do not** stretch the seal or trim length.

(e) Test cover pressure microswitches.

6. MAINTENANCE

Remove top-of-column covers

6.28 To remove the two top-of-column covers (item 31, Fig.1) proceed as follows:

i Using the hand control or foot switch control unit set the table to full height and full flexion position.

ii Switch the table 'off', unplug hand control and remove the main 30 Amp fuse from the table base (item 22, Fig.1).

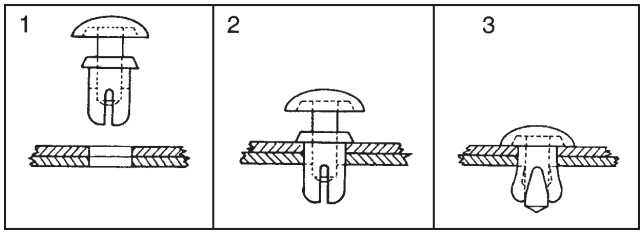
ii Remove the four screws and washers on the top of the covers and the two push rivets (see Fig.17) at the bottom edge of the covers.

iii Release the two top-of-column covers taking care when removing the covers to ensure that the gaiter for the Trendelenburg cylinder is not damaged.

Install top-of-column covers

Note: Before replacing covers check that all cables and hydraulic pipes are secured and that they cannot be pinched, chaffed or cut by any moving parts.

6.29 Installation of the top-of-column covers is the reverse of the removal procedure described in section 6.28. When installing the top-of-column covers make sure that the gaiter for the Trendelenburg cylinder is correctly installed.



To remove rivets :

a) Pull up plunger head (see 2 above) taking care not to damage rivet head.

b) Pull rivet out of cover section (see 1 above).

To replace rivets :

a) Align holes in cover sections (see 1 above).

b) Place rivet into hole so that the shoulder of the rivet shaft is flush with the outer cover face (see 2 above).

c) Press rivet plunger head until flush with cover surface (see 3 above).

Fig. 17 Cover retaining push rivets

Releasing the telescopic cover and upstand

6.30 To release the telescopic cover and upstand (items 46 and 47, Fig.2) proceed as follows:

i Remove the top-of-column covers as described in section 6.28.

ii Remove all the push rivets (see Fig. 17) holding the telescopic cover to the top bezel to enable the cover to be lowered.

iii Flex upstand to release cover from its lower edge.

iv Remove the 4 slotted screws and the base seal (item 42, Fig.2) from the lower edge of the upstand and remove the upstand (if access to the lower column is required).

Replacing the telescopic cover and upstand

Note: Before refitting covers and upstand check that all cables and hydraulic pipes are secured and that they cannot be pinched, chaffed or cut by any moving parts and that the ribbon cable mechanisms are working correctly.

6.31 Refit telescopic cover and upstand (if removed for access to lower column) by the reverse of section 6.30 but note that it may be necessary to leave the base seal to contract after initial assembly to the upstand to allow the edges to butt together (**do not** trim length to fit).

Removing the telescopic cover

6.32 To remove the telescopic cover (items 46, Fig.2) proceed as follows:

i Remove the top-of-column covers as described in section 6.28.

ii Remove all the push rivets (see Fig. 17) holding the telescopic cover to the top bezel. Then remove the rivets in each pair of telescopic cover section (top pair first then middle and lower) and remove the telescopic cover. Remove the upstand if required as detailed in section 6.30.

Replacing the telescopic cover

Note: Before refitting covers check that all cables and hydraulic pipes are secured and that they cannot be pinched, chaffed or cut by any moving parts and that the ribbon cable mechanisms are working correctly.

6.33 Refit the telescopic covers (and upstand if removed) in pairs in the correct sequence so they work correctly by the reverse of section 6.32.

Remove long and short trunk assemblies

6.34 To remove the long and short trunk assemblies proceed as follows:

i Remove the head section, leg supports, hip sections sacral extension and perineal post, or, head, leg and

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infill section whichever is applicable (i.e. all removable sections fitted to the table). Remove the tractions beams (see section 6.51) and the swivel joint assembly from the short trunk section (see section 6.53).

ii Remove the top-of-column covers as described in section 6.28.

iii Remove the black tops, side bars, aluminium covers, plastic covers and hinge covers from the long and short trunk assemblies.

iv Disconnect the hydraulic hoses (item 3 and 5, Fig.20) from the two break cylinders (item 7, Fig.20) and blank off the hydraulic connections and cylinders.

v Remove two screws (item 3, Fig.15), shakeproof washers and plain washers which secure the level tilt switch (item 4, Fig.15) to the short trunk assembly and remove the level tilt switch.

vi Remove the lateral tilt opto flag (item 4, Fig.13) to prevent damage by removing the two adjusting screws (item 2, Fig.13).

vii Remove the two screws (item 2, Fig.12) , shakeproof washers and plain washers which secure the Trendelenburg microswitch (item 3, Fig.12) to the tilt hanger (item 12, Fig.19) and remove the Trendelenburg microswitch and microswitch plate (item 13 and 14, Fig.19).

viii Remove the two screws (item 4, Fig.14), shakeproof washers and plain washers which secure the 'break' microswitch (item 1, Fig.14) to the short trunk and remove the 'break' microswitch.

ix Remove the ty-wrap straps which secure the hydraulic hoses and the electrical wires to the yoke and move the hydraulic hoses and electrical wires clear of the yoke. Note routing and attachment of hoses and wires.

WARNING

The long and short trunk assemblies are heavy, two people are needed to lift them. The next stages will enable the table top assemblies to move freely in Trendelenburg and then tilt positions and will need to be firmly supported until they have been removed and placed aside.

x Remove the two dome headed nuts (item 1, Fig.18) and plain washers from the Trendelenburg cylinder pivot pin on the underside of the short trunk assembly. Remove the pivot pin (item 4, Fig.18) and disconnect the Trendelenburg cylinder ram from the short trunk assembly. Collect the two spacers (item 5, Fig.18) which are fitted on the pivot pin.

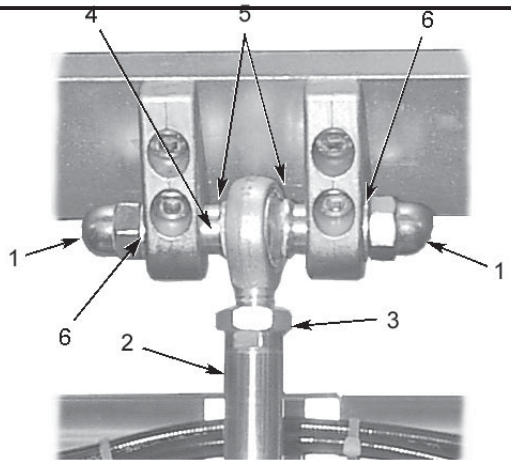

Fig. 18 Top of Trendelenburg cylinder

xi Remove the grub screw (item 5, Fig.21) which retains the pivot pin for the lateral tilt cylinder (item 1, Fig.21). Remove the pivot pin (item 6, Fig.21) and disconnect the clevis (item 10, Fig.21) on the lateral tilt cylinder ram from the tilt hanger (item 12, Fig.19 and item 7, Fig.21), take care not to misplace the bush inside the tilt hanger.

xii **See note Fig. 19.** Remove the hexagon headed bolt (item 1, Fig.19), and shakeproof washer (item 2, Fig.19).

xiii **See note Fig. 19.** The pivot pin (item 7, Fig.19) together with washer (item 10, Fig.19) which attaches the yoke (item 4, Fig.19) of the long trunk assembly to the hinge, can now be removed if the full weight of the Long and Short trunk assemblies are supported. Remove the long and short trunk assemblies and lay them aside upside down taking care to protect the radiopaque surfaces. Remove the Yoke pivot bush (item 11, Fig.19) and Sel-Lok pin (item 5, Fig.19) if required from the yoke and inner column respectively.

Install long and short trunk assemblies

Note: Before proceeding read the Caution and notes that precede section 6.18 and the WARNING in section 6.34.

6.35 To install the long and short trunk assemblies proceed as follows:

Note: Apply Rocol white grease (Part No.110477) to all pivot pins prior to assembly.

i Apply Rocol white grease (Part No.110477) to the Yoke pivot bush (item 11, Fig.19) and install into the inner column.

ii Using at least two people, carefully lift and correctly position the long and short trunk assemblies onto the inner column hinge (item 9, Fig.19) and replace the pivot pin, washer and Sel-Lok pin (items 5,7 and 10, Fig.19). Hold in place with hexagon headed bolt and shakeproof washer (items 1 and 3, Fig.19).

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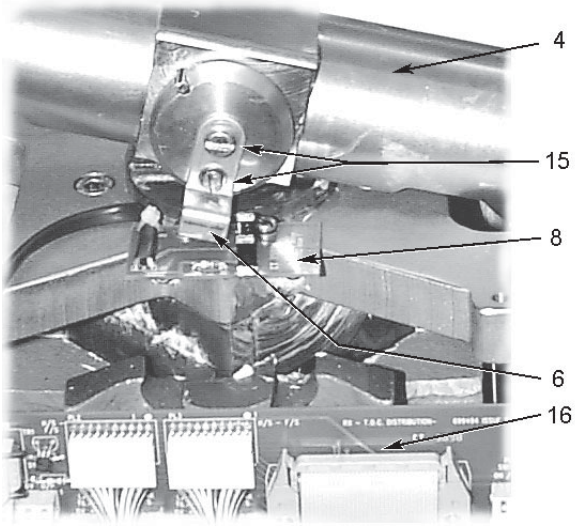

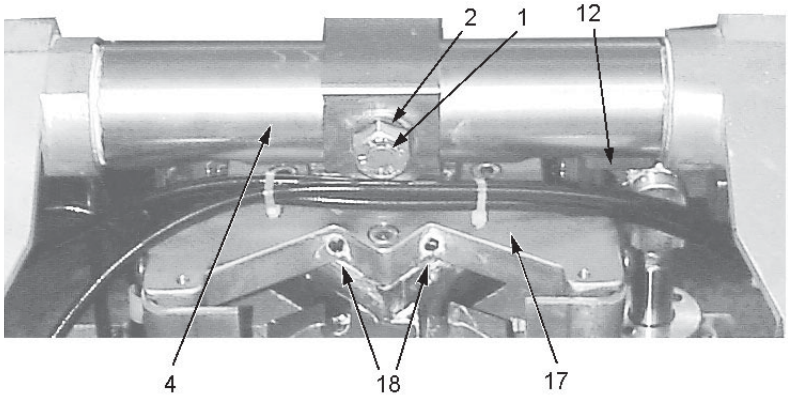

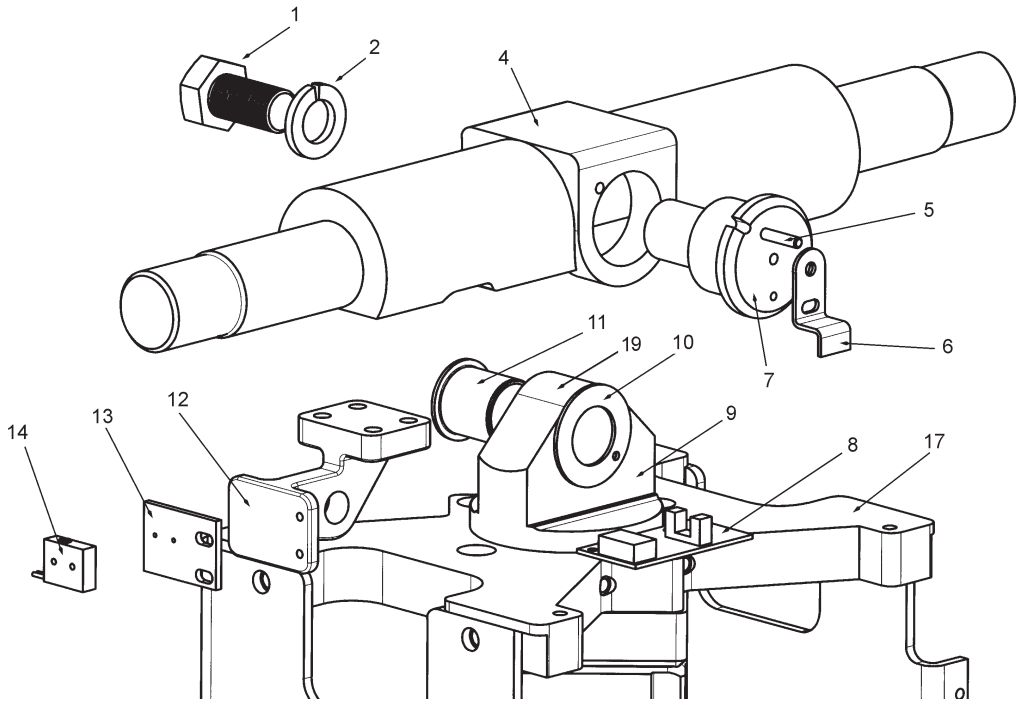

1	Yoke pivot bolt
2	Spring washer
4	Yoke
5	Sel-Lok pin
6	Tilt opto flag
7	Yoke pivot
8	Tilt opto board
9	Top of column casting
10	Washer
11	Yoke pivot bush
12	Tilt hanger
13	Microswitch plate
14	Microswitch
15	Microswitch adjusting screws
16	Top of column distribution board
17	Hinge plate
18	Height cylinder locking screws
19	Column assy. inner

NOTE: Revised new yoke assembly (preferred): New 'Thrust washer' (item 10, Part number 110905) either side of item 19. Thrust washers orientation is important, position black face of both towards head of pivot bolt. Use new 'Washer' (item 2, Part number 110904) and modified bush (no shoulder), with 'Loctite 270' (Part number 110906) on screw thread of item 1.

Fig. 19 Top of column hinge assembly detail

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iii Attach the eye-end of the Trendelenburg cylinder to the pivot plates on the cross member of the short trunk assembly as follows (refer to Fig.18 and Fig.21 as required) :

(a) Position the eye-end of the Trendelenburg cylinder between the pivot plates on the cross member.

(b) Install pivot pin through one pivot plate on cross member and install one spacer on pivot pin.

(c) Push pivot pin through the spacer and eye-end and install remaining spacer on the pivot pin.

(d) Push the pivot pin through the second spacer and the second pivot plate.

(e) Secure the pivot pin equally between the pivot plates using the two dome nuts and plain washers.

iv Position the clevis on the tilt cylinder ram around the tilt hanger and install the pivot pin taking care not to dislodge the bush in the tilt hanger. Secure the pivot pin in the lugs of the clevis with pivot pin grub screw.

v Route the hydraulic hoses and electrical wires over the yoke in the same positions noted in the removal procedure.

vi Remove the blanks from the break cylinder hydraulic hoses and connect the hydraulic hoses to each break cylinder.

vii Install the 'break' microswitch on the short trunk assembly, ensuring that two spacers are installed behind the bracket, and secure with two screws, shakeproof washers and plain washers.

viii Install the Trendelenburg microswitch on the tilt hanger with the microswitch plate and secure with two screws, shakeproof washers and plain washers.

ix Install the lateral tilt opto flag onto the hinge pivot pin and secure with two screws, shakeproof washers and plain washers.

x Install the level tilt switch on the inside web of the short trunk section, ensuring wires for the switch faces toward the end of the short trunk. Secure the level tilt switch with two screws, shakeproof washers and plain washers.

xi Use ty-wrap straps to secure the hydraulic hoses and the electrical wires.

xii Top up the hydraulic system reservoir as described in section 6.19.

xiii Check and adjust the Trendelenburg and break microswitches, lateral tilt opto and level tilt switch as described in sections 6.22-6.23.

xiv Carry out a full functional check of the operation table as described in section 6.17.

xv Install plastic covers on the hinge pivot points and install the plastic covers, aluminium outer covers, black tops and side bars on the long and short trunk assemblies. Make sure that the plastic covers and the aluminium outer covers do not protrude above the top face of the long and short trunk castings and that they do not restrict push button movement.

xvi Install top-of-column covers as described in section 6.29.

xvii Replace the swivel joint assembly to the short trunk assembly (see section 6.54) and then attach the traction beams (see section 6.52).

Remove break cylinder

Note: Before proceeding read the Caution and notes that precede section 6.18.

6.36 To remove a break cylinder proceed as follows:

i At the applicable side of the long trunk assembly, remove the side bar, aluminium outer cover, inner plastic cover and the hinge cover.

ii Disconnect the three hydraulic hoses (item 4, Fig.20) from the applicable break cylinder (item 7, Fig.20) and blank off the hydraulic connections and cylinder (items 3 and 5, Fig.20).

iii At the short trunk end of the break cylinder, remove the grub screw which secures the pivot pin (item 2, Fig.20) and remove the pivot pin.

iv At the long trunk end of the break cylinder, remove the grub screw which secures the pivot pin (item 6, Fig.20) and remove the pivot pin.

v Remove break cylinder from long trunk assembly.

Install break cylinder

6.37 To install a break cylinder proceed as follows (referring as required to Fig.20) :

i Position the break cylinder in the long trunk assembly with the cylinder eye-end positioned at the long trunk end.

ii Apply Rocol white grease (Part No.110477) to the pivot pin for the long trunk end and install the pivot pin in the long trunk and the break cylinder eye-end. Secure the pivot pin to the long trunk with a grub screw.

iii Apply Rocol white grease (Part No.110477) to the pivot pin for the short trunk end and install the pivot pin in the short trunk and the break cylinder piston eye-end. Secure the pivot pin to the short trunk with a grub screw.

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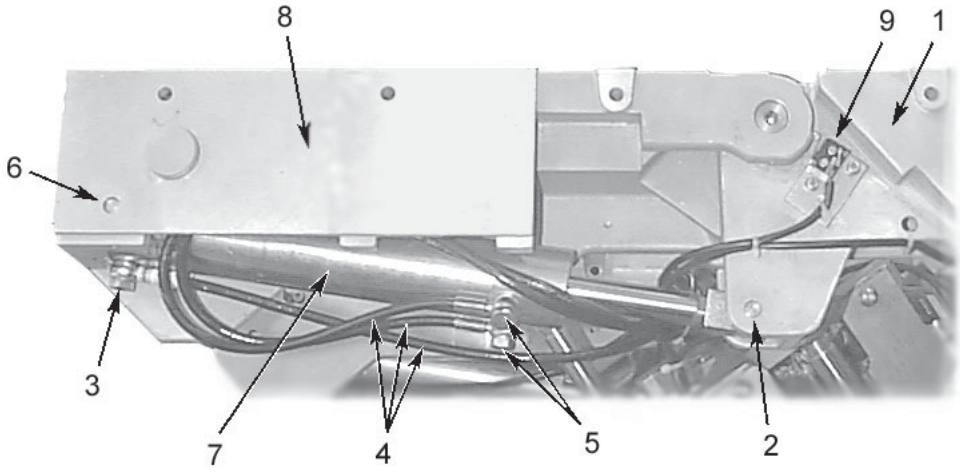

1	Short trunk assembly
2	Short trunk pivot pin
3	Hydraulic connection
4	Hydraulic hoses
5	Hydraulic connection
6	Long trunk pivot pin
7	Break cylinder
8	Long trunk assembly
9	Break microswitch

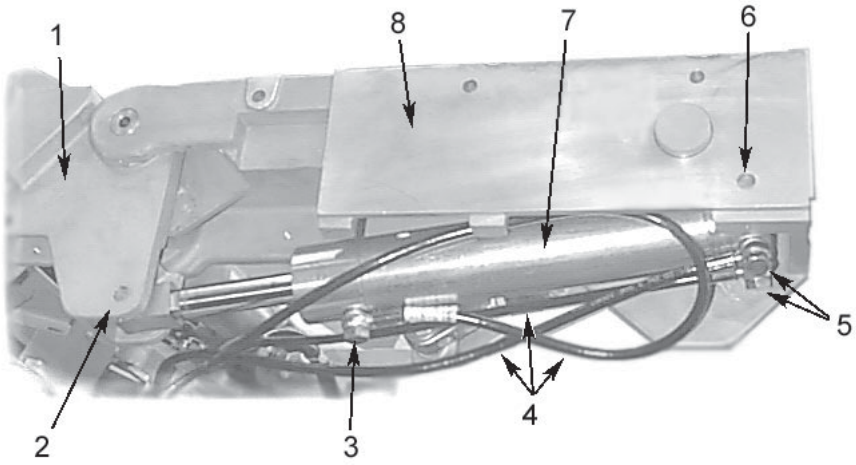

Fig. 20 Break cylinders

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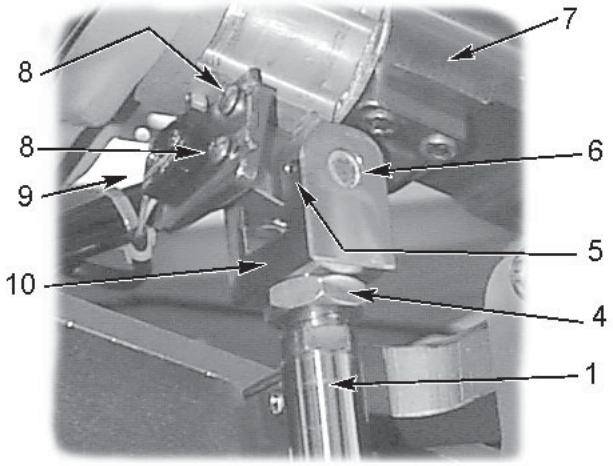

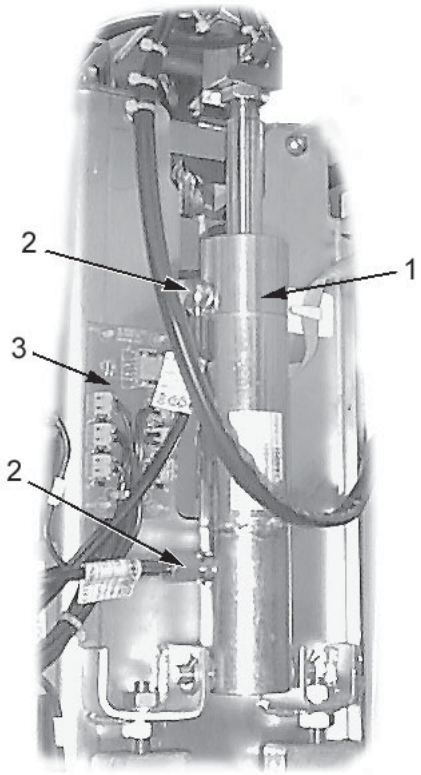

1	Tilt cylinder
2	Hydraulic connection
3	Top of column solenoid board
4	Clevis nut
5	Pivot pin grub screw
6	Pivot pin
7	Tilt hanger
8	Microswitch adjusting screws
9	Break microswitch
10	Clevis
11	'R' clip
12	Washer
13	Pivot pin

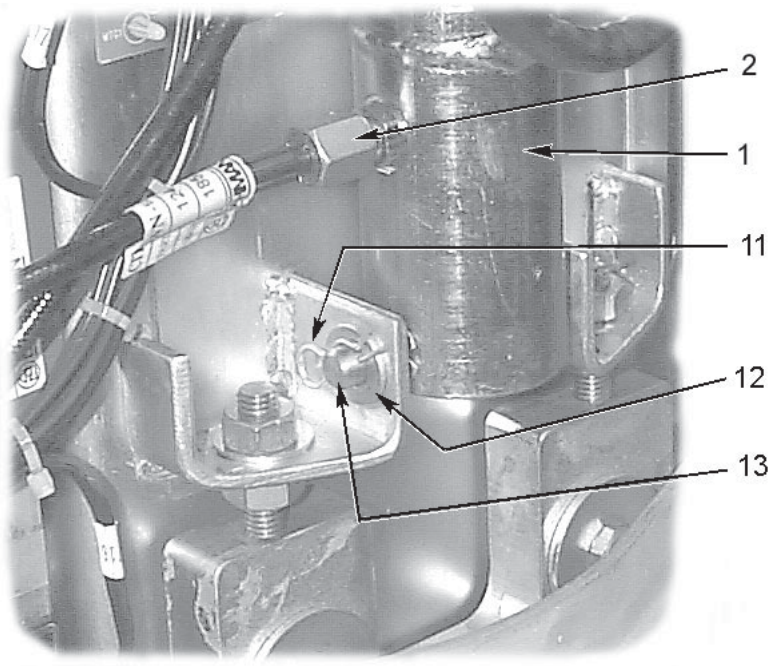

Fig. 21 Lateral tilt cylinder (upper bezel omitted for clarity)

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iv Remove the blanks from the three hydraulic hoses for the break cylinder and connect the hydraulic hoses to the break cylinder.

v Top up the hydraulic system reservoir as described in section 6.19.

vi Carry Out a functional check of the operation table as described in section 6.17.

vii Install the hinge cover, inner plastic cover, aluminium outer cover, and side bar on the applicable side of the long trunk assembly. Make sure that the inner plastic cover and the outer aluminium cover do not protrude above the top face of the long trunk casting and that they do not restrict push button movement.

Remove lateral tilt cylinder

Note: Before proceeding read the Caution and notes that precede section 6.18.

6.38 To remove lateral tilt cylinder (item 1, Fig.21) proceed as follows:

i Remove the top-of-column covers as described in section 6.26, and release the telescopic column cover as described in section 6.28.

ii Disconnect the two hydraulic hoses (item 2, Fig.21) from the lateral tilt cylinder (item 1, Fig.21) and blank off the hydraulic connections.

iii Remove the grub screw (item 5, Fig.21) which retains the lateral tilt cylinder pivot pin (item 6, Fig.21) and remove the pivot pin. Disconnect the lateral tilt cylinder from the tilt hanger assembly (take care not to loose the bush in the tilt hanger).

iv At the column chassis, remove the 'R'-clip (item 11, Fig.21) from each end of the pivot pin (item 13, Fig.21). Remove the washers (item 12, Fig.21) and remove the pivot pin.

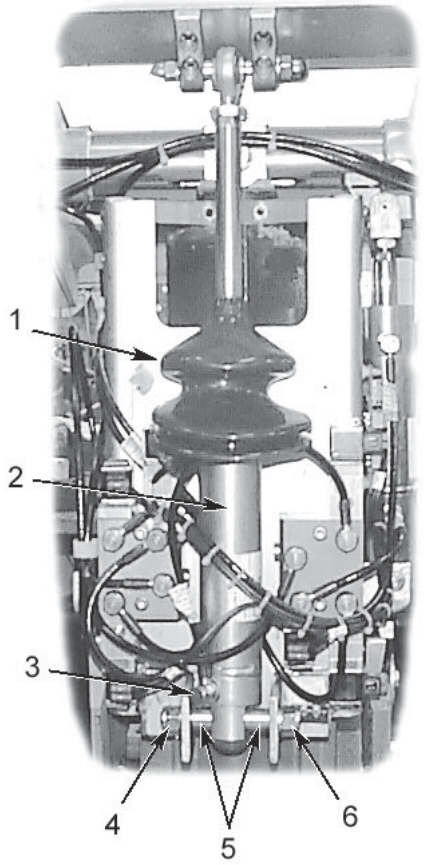
v Remove the lateral tilt cylinder and remove clevis if refitting a new cylinder by releasing nut (item 4, Fig.21) and unscrewing clevis (item 10, Fig.21).

Install lateral tilt cylinder

6.39 Installation of the lateral tilt cylinder is the reverse of the removal procedure, however, note the following points on installation and refer to Fig.21 as required :

i Apply Rocol white grease (Part No.110477) to the pivot pins prior to installation.

ii On completion, top-up the hydraulic system reservoir as described in section 6.19, and carry out a functional test of the operation table as described in section 6.17.



1 Trendelenburg cylinder bellows
2 Trendelenburg cylinder
3 Hydraulic connection
4 Pivot pin nut
5 Spacers
6 Pivot pin

Fig. 22 Trendelenburg cylinder

Remove Trendelenburg cylinder

Note: Before proceeding read the Caution and notes that precede section 6.18.

6.40 To remove the Trendelenburg cylinder (item 2, Fig.22) proceed as follows:

i Remove the top-of-column covers as described in section 6.28, and release the central column telescopic cover as described in section 6.30.

ii Disconnect the two hydraulic hoses from the Trendelenburg cylinder and blank off the hydraulic connections and cylinder (only one connection shown, item 3 Fig.22, the second one is underneath the bellows, item 1 Fig.22).

iii At the short trunk assembly, remove the two dome headed nuts (item 1, Fig.18) and plain washers (item 6, Fig.18) from the Trendelenburg cylinder pivot pin

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(item 4, Fig.18) and remove the pivot pin to disconnect the eye-end of the Trendelenburg cylinder from the short trunk assembly (taking care to retain the spacers (item 5, Fig.18).

iv At the column chassis, remove nut (item 4, Fig.22) from each end of Trendelenburg cylinder pivot pin (item 6, Fig.22) and remove pivot pin (take care to retain spacers item 5, Fig.22).

v Remove the Trendelenburg cylinder and remove the eye end from the piston rod.

Install Trendelenburg cylinder

6.41 Installation of the Trendelenburg cylinder is the reverse of the removal procedure, however, note the following points on installation:

i Apply Rocol white grease (Part No.110477) to the pivot pins prior to installation.

ii When connecting Trendelenburg cylinder to short trunk assembly and column chassis ensure two spacers are fitted on each pivot pin.

iii On completion, top up the hydraulic system reservoir as described section 6.19, and carry out a functional test of the operation table as described in section 6.17.

Remove height cylinder

WARNING

The following procedure will need at least three people as the table is heavy. Extreme care must also be taken to avoid injury and damage to the table.

Note: Before proceeding read the Caution and notes that precede section 6.18.

6.42 To remove the height cylinder power table to maximum height and proceed as follows:

i Remove top-of-column covers (see section 6.28).

ii Gain access to the underside of the table base by carefully laying the table onto its side on the floor.

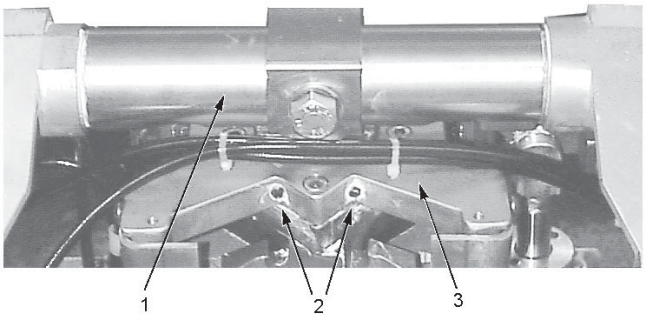

Fig. 23 Top of column detail

iii Locate and remove the four screws (item 2, Fig.23) in the hinge plate (item 3, Fig.23) which secure the rod end of the height cylinder (item 4, Fig.24).

iv Remove the eight screws (item 8, Fig.24) and washers and remove the two clamp blocks (item 3, Fig.24) which attach the pivot pin (item 9, Fig.24) for the height cylinder to the base of the table.

v Disconnect the bottom hydraulic hose (Fig.24, item 6) withdraw the height cylinder from the table column and then reconnect the hose. Power cylinder to minimum height to return most of the hydraulic oil to the reservoir. Disconnect both hydraulic hoses and blank off the hydraulic connections and cylinder.

vi Remove the pivot pin from the cylinder end of the height cylinder and remove the rod end from the piston rod.

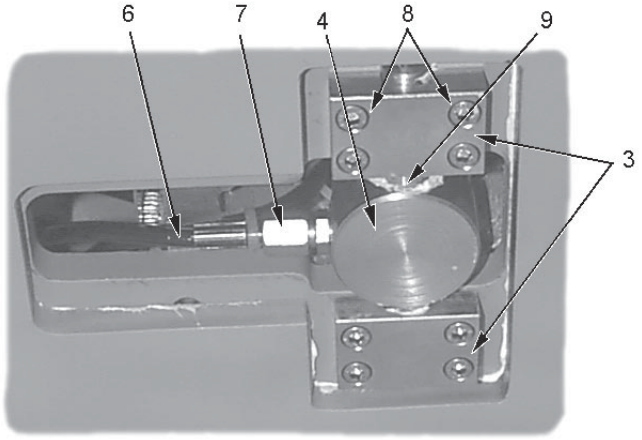

Fig. 24 Bottom of height cylinder detail

Install height cylinder

6.43 To install the height cylinder proceed as follows referring as required to Fig.23 and 24 :

i Apply Loctite 222 (Part No.670650) to the threads of the height cylinder piston rod and install the rod end on the piston rod of the height cylinder.

ii Remove the blanks from hydraulic hoses and cylinder and connect the hoses to the height cylinder. Power cylinder to maximum height and then disconnect the bottom hose.

iii Install the height cylinder in the table column with the rod end upper most and reconnect the bottom hose. Make sure that the rod end seats correctly in the hinge plate.

iv Secure the rod end of the height cylinder to the hinge plate with four set screws (item 2, Fig.23). **It is important that the socket set screws are below flush of hinge plate when fully tightened.**

Note: Apply Loctite 222 (Part No.670650) to the threads of the screws prior to installation.

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v Apply Rocol white grease to the pivot pin and install the pivot pin in the cylinder end of the height cylinder.

vi Position the pivot pin on the base of the table and secure it with two clamp blocks. Secure the two clamp blocks with eight screws and washers.

vii Place the operation table in the upright position.

viii Top up the hydraulic reservoir as described in section 6.19.

ix Carry out a functional check of the operation table as described in section 6.17.

x Install the top-of-column covers as described in section 6.29.

Gas spring replacement

6.44 To remove and replace a head or leg section gas spring proceed as follows :

Note: In Fig. 25 a head section is shown, the arrangement is basically the same for a leg section also see WARNINGS and Caution in section 6.4.

i Release gas piston nut (1, Fig.25) from link (4, Fig.25)

ii Release grub screw (2, Fig.25) retaining pivot pin (3, Fig.25) and remove the pivot pin by inserting a screw into the end of the pivot pin to aid removal.

iii Unscrew the gas spring piston from the link.

iv Replace a new gas spring by the reverse of above (adjusting it as below) and lubricate the pivot pin with grease.

v Adjust the gas spring by screwing the piston into the link until the actuator nipple has 0.5-1.0mm clearance with the release bar and ensure that both gas springs of the section are adjusted to match. Finally tighten the piston nut (1, Fig.25) onto the link.

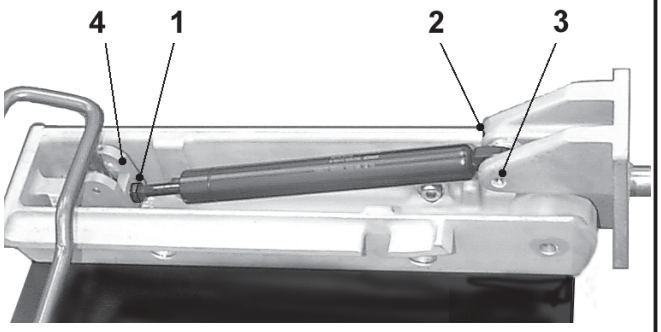

Fig. 25 Gas spring detail

Remove batteries

6.45 To remove the batteries proceed as follows:

i Remove the base covers as described in section 6.26.

ii Remove the 30A fuse (item 4, Fig.4).

iii Disconnect the positive (+) and negative (-) leads from each battery.

iv Using the cord provided, lift the batteries from base.

Install batteries

6.46 Installation of the batteries is the reverse of the removal procedure, then replace covers as section 6.27.

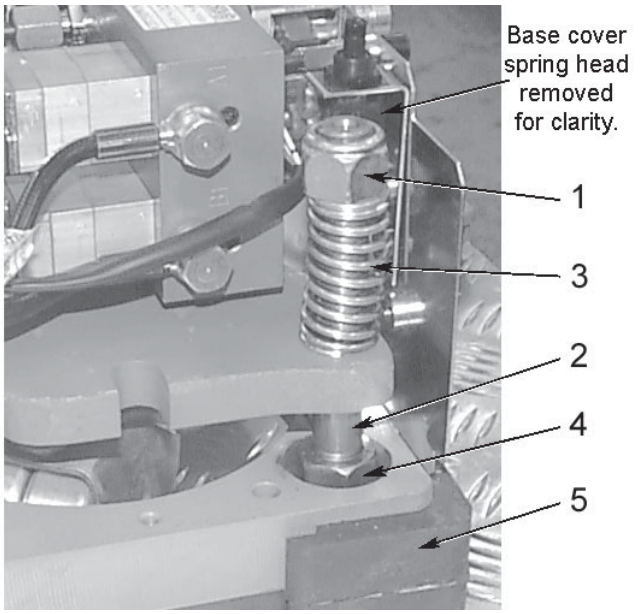

Fig. 26 Base feet detail

Remove the base feet

6.47 To remove the base feet, proceed as follows:

i With the table in the castor position remove the base covers as described in section 6.26.

ii Remove each of the four corner feet as follows:

(a) Turn the Nyloc nut (1, Fig.26) down sufficiently to add and lock another nut onto it.

(b) Loosen the nut (4, Fig.26) securing the corner guide pin (2, Fig.26) to the base.

(c) Loosen and remove the guide pin from the foot (5, Fig.26).

(d) Remove the foot from the base by pulling it away from the base with the two Sel-Lok pins.

iii To remove the fifth foot, proceed as follows:

(a) Remove the 30A fuse (item 4, Fig.4).

(b) Remove the battery at the short trunk end of the base (see section 6.45).

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(c) Remove one socket head countersunk screw with spring washer and remove the foot from the base with the two Sel-Lok pins.

Install the base feet

6.48 To install the base feet, proceed as follows:

i Install each of the four corner feet as follows:

(a) Fit two new Sel-Lok pins into the foot, ensuring they are pressed to the bottom of the blind holes.

(b) Position the foot on the base plate and secure it using corner guide pin, nut and spring washer (spring 3, Fig.26 should still be on guide pin).

(c) Remove the lock nut placed at stage (i) section 6.47 and turn Nyloc nut (item 1, Fig.26) up until it is flush with the top of the guide pin (item 2, Fig.26) as shown in Fig.26.

ii Install the fifth foot as follows:

(a) Fit two new Sel-Lok pins into the foot, ensuring they are pressed to the bottom of the blind holes.

(b) Position the fifth foot on the base plate and secure it using the socket head countersunk screw and spring washer.

(c) Install the battery at the short trunk end of the table base and replace the 30A fuse.

iii Install the base covers as described in section 6.27.

Infill interlocking mechanism replacement

6.49 To remove and replace the interlocking mechanism in the infill section, refer to Fig.28 and proceed as follows:

i Release each interlock rod (4 and 6) from the connecting block (2) by releasing the grub screws in connecting block (2).

ii Replace any worn parts and reassemble as shown in Fig.28, with 5mm of rod 6 and 4mm of rod 4, protruding through the connecting block (2) and springs (3) correctly positioned. Finally adjust the mechanism by inserting tool No.1752 into the guide pin hole and pushing fully home, rod (4) should protrude 6.5mm out of the infill casting.

iii Lubricate all moving parts with a smear of light machine oil and check operation, (i.e. a head or leg section guide pin (1) should operate the mechanism as shown in Fig.27).

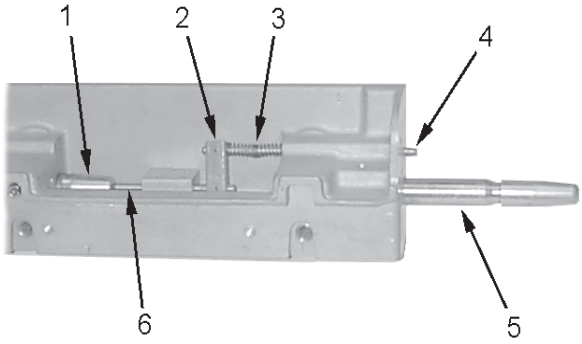

Fig. 27 Infill interlocking mechanism

Push button replacement and adjustment

6.50 To replace the push-button catches remove any attached table section, refer to Fig.28 and proceed as follows:

i Remove screw (1) to release the push-button. The right hand push-button operates in conjunction with spring loaded plungers (2) which hold the push-button 'in' when pressed with a section in position. To access to these plungers place a screwdriver in catch retainer (3) and remove plungers (2) with spring.

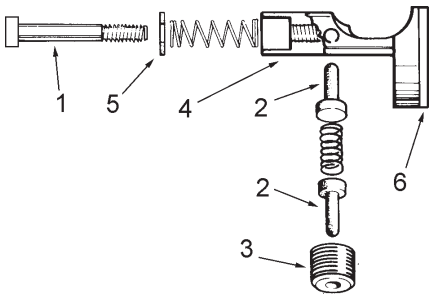

Fig. 28 Catch mechanism

ii If the plunger has become damaged or distorted it should be replaced. If the latch has scored the guide pin of head, leg or infill section the complete push-button and guide pin should be replaced.

iii Reassemble using new parts as required with Loctite on screw (1) and ensure free movement of all parts, lubricating with light machine oil. It is advised that setting tool number T1612, Part No. 759579 is used when finally adjusting push buttons as follows:

(a) Push setting tool T1612 into guide pin hole up to the edge of the groove and tighten screw (1) until the washer (5) just touches the side of the casting with the setting tool in place.

(b) Check the setting of the push button by sliding the tool in and out slowly, it should be possible to feel the push button rubbing on the gauge by resting a finger lightly on the button and a slight jump of the button will be felt when the gauge contacts the button.

6. MAINTENANCE

Traction beam removal

6.51 To remove the traction beam assembly (item 2, Fig.29) from the knuckles proceed as follows:

i Remove the slotted screw (item 1, Fig.8) and the two locking socket set screws as (i) in section 6.13.

ii Loosen the two socket dog point set screws under the locking socket set screws removed in (i) above.

iii The traction beam can now be withdrawn but note that the pressure rods (3, Fig.29) and pressure blocks (4, Fig.29) are not attached to the knuckle beam casting and should be captured as the beam is withdrawn.

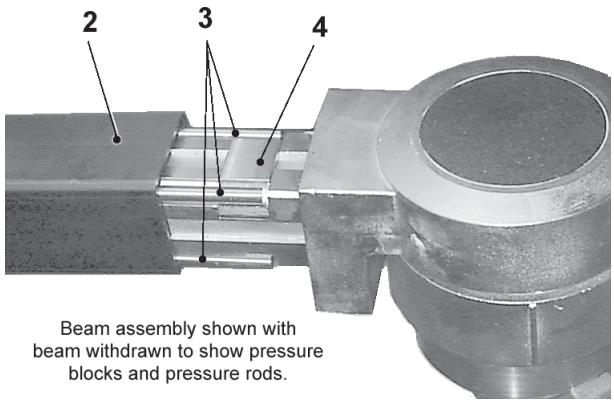

Fig. 29 Beam attachment

Traction beam replacement

6.52 To replace the traction beam assembly (2, Fig.29) onto the knuckles proceed as follows:

i Apply grease into the recess under the pressure blocks (4, Fig.29) and locate the blocks into the knuckle beam casting slots. (Note orientation, wedge facing up, in line with pressure rods).

ii Hold the pressure rods (3, Fig.29) against the angled faces of the pressure blocks and beam. Slide traction beam assemblies over pressure rods and firmly up to the end stop. Tighten socket dog point set screws to secure traction beams.

Note: After initial tightening of set screws check that beam is tight on knuckle beam castings by rocking the joint, this will ensure the pressure rods seat correctly.

iii Retighten socket dog point set screws and lock each one in position using a socket set screw.

iv Finally secure tube using the slotted screw (2, Fig.8) with screw retainer.

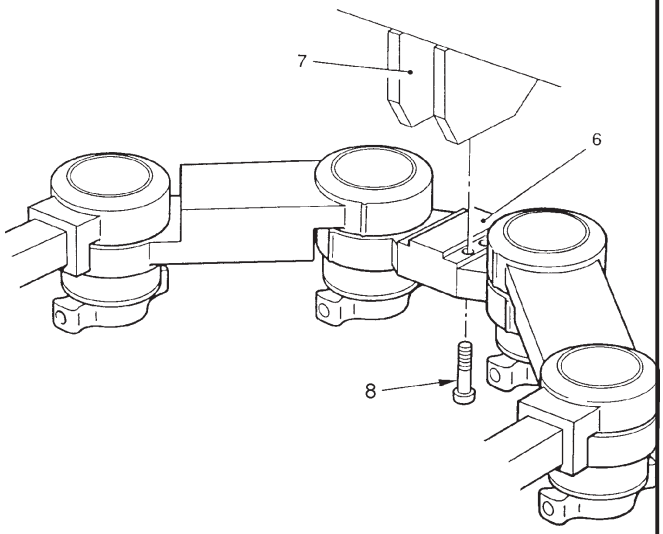

Fig. 30 Swivel joint attachment detail

Remove swivel joint assembly from short trunk

6.53 Remove the swivel joint assembly (see Fig.30) as follows after removing the traction beams as detailed in section 6.51:

WARNING
The swivel joint assembly must be adequately supported during the removal procedure.

i Remove screws (8, Fig.30) securing the swivel joint assembly (6, Fig.30) to the drop plates (7, Fig.30) under the short trunk assembly and remove the swivel joint assembly.

Note: Once removed no further user maintenance is recommended.

Refit swivel joint assembly to short trunk

6.54 Refitting the swivel joint assembly to the short trunk is the reverse of the removal procedure, but note that:

i Assistance will be needed to offer-up and align the assembly when fitting screws (8, Fig.30).

ii Screw lock (670650) must be applied to screws (8, Fig.30) before they are refitted.

iii Replace the traction beams as detailed in section 6.52.

Traction beam swivel joint

6.55 Before replacing parts inside the swivel joint check the condition of the parts. Grease, dirt or contamination especially on the ball bearings, ball retaining ring or locking rings may be preventing correct function. Cleaning, reassembly and adjustment may be all that is required, only replace parts that are worn or damaged. The teeth on

6. MAINTENANCE

the locking rings will be quite heavily indented, this is due to 'bedding in' and is normal. The parts that need particular attention and may need replacing are the ball retaining ring, ball bearings, riser, spring and upper cam. If the locking rings need to be replaced the swivel joints should be returned to the After Sales Service Department for refurbishment (see address inside the front cover). Adjustment is detailed in section 6.24 refer to this section as required. Replace parts by following the procedure detailed below and referring to Fig.16 for reference:

CAUTION

Never force a locking knob as this may cause damage, if it is too tight it needs to be adjusted. Never lubricate the 4mm ball bearings, ball retaining ring, riser, or the locking rings, as this will impair function. All other lubrication detailed below should be with "Beacon 3" grease (part number 670160).

i Remove the top and bottom "heyco" plugs.

ii Disassemble the joint by removing the M16 half nut. **Do not reuse this nut.**

iii Carefully lift off the top casting complete with the small thrust bearing. Be aware that loose ball bearings are under this top casting. Remove these loose balls and the other internal parts. Check all the internal components as advised above for grease or contamination.

iv Remove the upper cam by releasing the M10 self locking nut. This will allow the locking knob with its thrust washer, thrust bearing and the upper cam to drop out. **Do not re-use the M10 nut.**

v Clean and/or replace parts as required, reassemble and adjust as detailed in the following sections.

vi Lubricate the locking knob and upper cam mating surfaces and refit into the bottom casting with the thrust washer and **new M10 self locking nut**. With the locking knob in the locked position, tighten the nut only as far as necessary to locate the upper cam legs into the casting. Make sure the knob is left in the locked position.

vii Replace all the other parts ensuring that:

(a) No grease is applied to the locking rings, riser, ball retaining ring, or ball bearings.

(b) All thrust bearings are lightly greased with "Beacon 3" grease (part number 670160).

(c) All the ball bearings and ball retaining ring are correctly located in place.

(d) The small thrust bearing races in the top casting are the right way round. One has a larger I/D and this goes into the casting first.

(e) Thread lock (part number 670650) is applied to the **new M16 half nut**.

viii Carefully, without disturbing the ball bearings, locate the top casting assembly onto the bottom casting assembly and fit the new M16 half nut, finger tight only. Now ensure that the top casting assembly is free to rotate. Tighten the M16 nut to 8N-m (72lb-in). This is to pre-load the thrust bearings and is not an adjustment.

ix With the locking knob still in the locked position tighten the M10 self locking nut sufficiently to **just** take out any loose vertical movement and then refer to section 6.24 to adjust correctly.

x Refit the "heyco" plugs when adjustment is complete. Use silicone sealant around the large top one.

Removal and installation of hydraulic components

Note: Before proceeding read the Caution and notes that precede section 6.18.

6.56 The hydraulic power unit is replaced as a complete unit and is a self-evident procedure. The manifold and solenoid valve assemblies should be treated similarly. Hydraulic cylinder replacement is covered individually in sections 6.36 to 6.43. Check all table functions after removal and installation, as detailed in section 6.17.

Removal and installation of electrical components

6.57 All PCBs are non-repairable items and should be replaced as complete units. Always employ the correct procedures when handling PCBs to avoid damage from static discharge (if in doubt on how to handle static sensitive devices such as PCBs please contact the Eschmann After Sales Service Department). Replacement of all electrical components is a self evident procedure but carry out any resetting or adjustment as detailed within this manual.

FAULT DIAGNOSIS

6.58 The fault diagnosis table that follows lists possible causes of faults and/or conditions that can be rectified during maintenance procedures, or use, depending on the remedy given. Electrical/electronic faults should be traced and rectified in conjunction with the relevant circuit diagrams. For any faults, listed or not, which cannot be resolved, please contact the Eschmann After Sales Service Department, for details see inside front cover.

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TABLE 1 - FAULT DIAGNOSIS

Fault/Condition	Possible Cause	Remedy
1 Code 01 is displayed.	Battery voltage low, i.e. below 18V d.c. on load.	Charge batteries using internal battery charger. Engineer to check condition of batteries and replace if necessary.
2 Code 02 is displayed.	Battery voltage critically low, i.e. less than 18V d.c. off load.	Charge batteries using external battery charger. Engineer to check condition of batteries and replace if necessary.
Note: Low battery detection does not cause the table to stop moving. The warnings can only be cleared by switching the table 'off' at the base and then 'on' again. Code 02 stops all table movements except Trendelenburg.		
3 Code 03 is displayed and a fast repeated audible warning is given from the base and the table will not move when any motion is selected.	One of the base cover pressure switches has operated.	Remove object from base cover.
4 Code 03 is displayed and a fast repeated audible warning is given from the base when the table is moving from the castor position to the brake position.	One of the base cover pressure switches has been operated. If the hand control button remains pressed when the condition occurs, the table will stop for two seconds, reverse its movement for 1.5 seconds and then stop.	Remove object from base cover.
5 Code 04 is displayed and Table will not move when Trend, reverse Trend, Break Up or Break Down buttons are pressed.	Level tilt switch has operated.	Press opposite button, e.g. Reverse Trend instead of Trend or, Break Up instead of Break Down.
6 Code 04 is displayed and Table movement stops when moving to Trend or Break Down positions.	Level tilt switch has operated to limit movement of table top.	Press opposite button, e.g. Reverse Trend instead of Trend or Break Up instead of Break Down.

(Continued)

6. MAINTENANCE

TABLE 1 (CONTINUED) - FAULT DIAGNOSIS

Fault/Condition	Possible Cause	Remedy
7 Code 05 is displayed and an LED is illuminated (see below), the Table stops moving and there is a continuous audible warning given. **Button Pushed** — **LED illum'd.** Trend (3 or 4) — Patient (L) - (1) Break (5 or 6) — Patient (R) - (2) Lat'l Tilt (7 or 8) — Brake - (13) Height (9 or 10) — Height - (10) Castor (12) — Castor - (12) Auto level (11) — Auto level - (11)	The applicable table motion has been used for more than 40 seconds (consider whether a button has been accidentally depressed and held down). Hand control membrane faulty and making contact without being touched.	Switch the table 'off', using the table on/off switch, (Fig.1 item 18), and then switch back 'on'. Engineer to check Hand control.
8 Code 06 is displayed and Table stops moving.	Table duty cycle has been exceeded (2 minutes on in 8 minutes).	Wait for sufficient time to allow duty cycle protection circuit to re-enable.
Note: With this condition, movement of the table top to the full Trendelenburg position (orange hand control button 3 Fig. 4) is still possible.		
9 Code 07 is displayed and Table stops moving, and there is a continuous audible warning given.	A hydraulic solenoid has gone open or short-circuit.	Engineer to identify and replace the faulty hydraulic solenoid.
10 Code 08 is displayed.	Height Up button is pressed when table is not on its feet.	Warnings will stop when Height Up button is released. Press Brake button (13) then Height up (9).
11 Code 09 is displayed.	Castor button is pressed with table above minimum height.	Warnings will stop when Castor button is released. Press Height Down button (10) until minimum height then Castor button (12).
12 Code 10 is displayed and footswitch cannot be selected by pressing 'footswitch' button (see Fig. 4 item 14) on the hand control.	Footswitch unit not connected.	Connect footswitch unit.

(Continued)

6. MAINTENANCE

TABLE 1 (CONTINUED) - FAULT DIAGNOSIS

Fault/Condition	Possible Cause	Remedy
13 Code 10 is displayed and footswitch LED flashes (see Fig. 4 item 14) and table stops moving,	The footswitch system has failed.	Re-select footswitch by pressing footswitch select button and re-try. If fault repeats, engineer to check connections and, if necessary, replace footswitch.
14 Code 11 is displayed and a single 'beep' sounds.	Break down selected when traction beams are stowed. Auto level pressed when traction beams are stowed.	Rotate traction beams well clear of trunk sections, repeat break down. Rotate traction beams well clear of trunk sections, repeat auto level.
15 A single audible warning is givenfrom the hand control and the table will not move.	Height down button is pressed when table is already at minimum height.	Warnings will stop when appropriate hand control button is released.
16 Red emergency stop LED continuously illuminated accompanied by a continuous audible warning sound from the base and an intermittent warning sound from the hand control.	The 'emergency stop' button has been pressed.	To reset 'emergency stop', switch table 'off' and then 'on' again.
17 Table will not move and main control board audible warning sounds.	The serial communication link between the main control board and the hand control has failed, e.g. because of a broken wire or the hand control becoming disconnected.	Reconnect hand control or engineer to locate and repair broken wire. Try different handset socket, if problem solved engineer to inspect faulty socket.
18 Table will not move.	End door (short trunk section end) is open.	Close door or operate door microswitch.

CIRCUIT DIAGRAM INDEX

Drawing No.	Title	Fig. No.	Page No.
699501	Base distribution board	32	39
699569	Opto board	33	39
699497	Top-of-column solenoid board	34	40
699755	Pin connections	35	40
700303	Tilt opto board	36	40
699495	Top-of-column distribution board	37	41
699980	Battery charger distribution board	38	42
699819	RX500 Main control board	39	43
699364	RX500 System diagram	40	44

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1. Patient orientation button and green indicator.
2. Patient orientation button and green indicator.
3. Trendelenburg button (orange).
4. Reverse Trendelenburg button.
5. Break (Extension) button.
6. Break (Flexion) button.
7. Lateral tilt button.
8. Lateral tilt button.
9. Table raising button.
10. Table lowering button.
11. Return to pre-set (auto level) position button.
12. Castor button and yellow indicator.
13. Brake button and yellow indicator.
14. Footswitch control button and yellow indicator.
15. Display panel for two digit code .
16. Emergency stop button and red indicator.

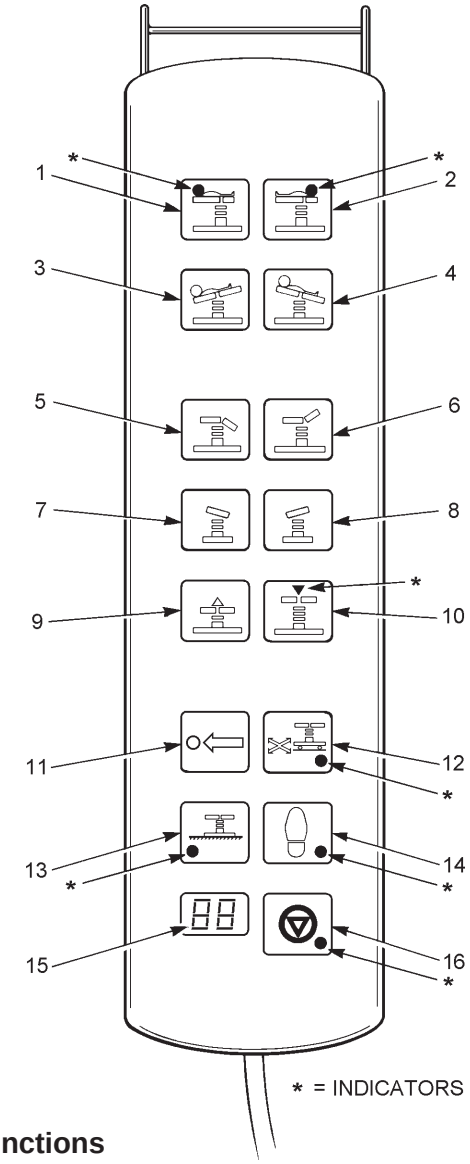

Fig. 31 Hand control functions

TABLE 2 : CODES FOR 2-DIGIT DISPLAY

CODE	CAUSE	REMEDY
01	Battery voltage low.	Recharge batteries as soon as possible.
02	Battery voltage **critically** low.	Recharge batteries immediately.
03	Base cover switch operated.	Remove pressure or weight from cover.
04	Maximum Break or Trendelenburg achieved.	Select reverse of function.
05	Button pressed for over 40 seconds.	Switch table 'off' then 'on' with switch 18.
06	Table duty cycle (2 min. in 8) exceeded.	Allow time for auto reset.
07	Hydraulic solenoid failure.	Call engineer.
08	Height Up button pressed with table on castors.	Brake table with button (13).
09	Castor button pressed with table raised.	Lower table fully with button (10).
10	Footswitch selected without Footswitch.	Connect footswitch.
10+LED	Footswitch system failure.	Retry and/or call engineer.
11	Break down or Auto level selected with beams stowed	Rotate beams well clear of trunk sections.

See Table 1 for more details of the codes and remedies.

6. MAINTENANCE

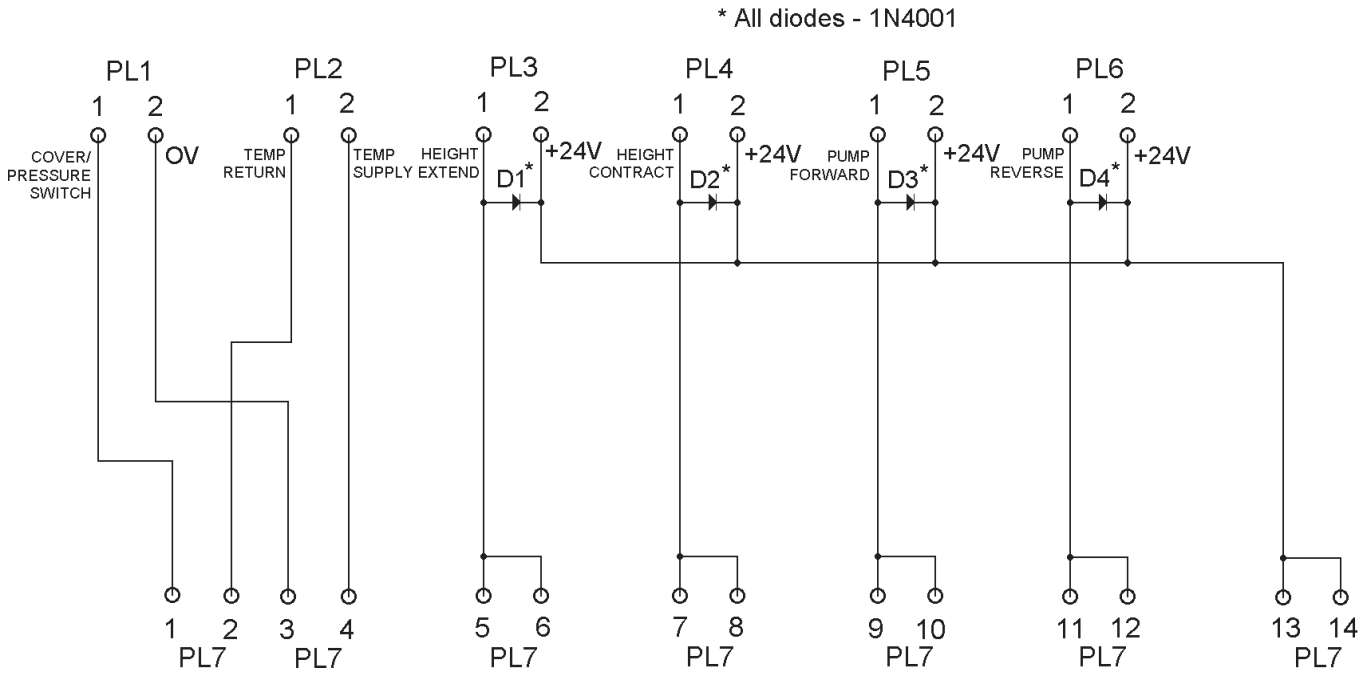

Fig. 32 Base distribution board

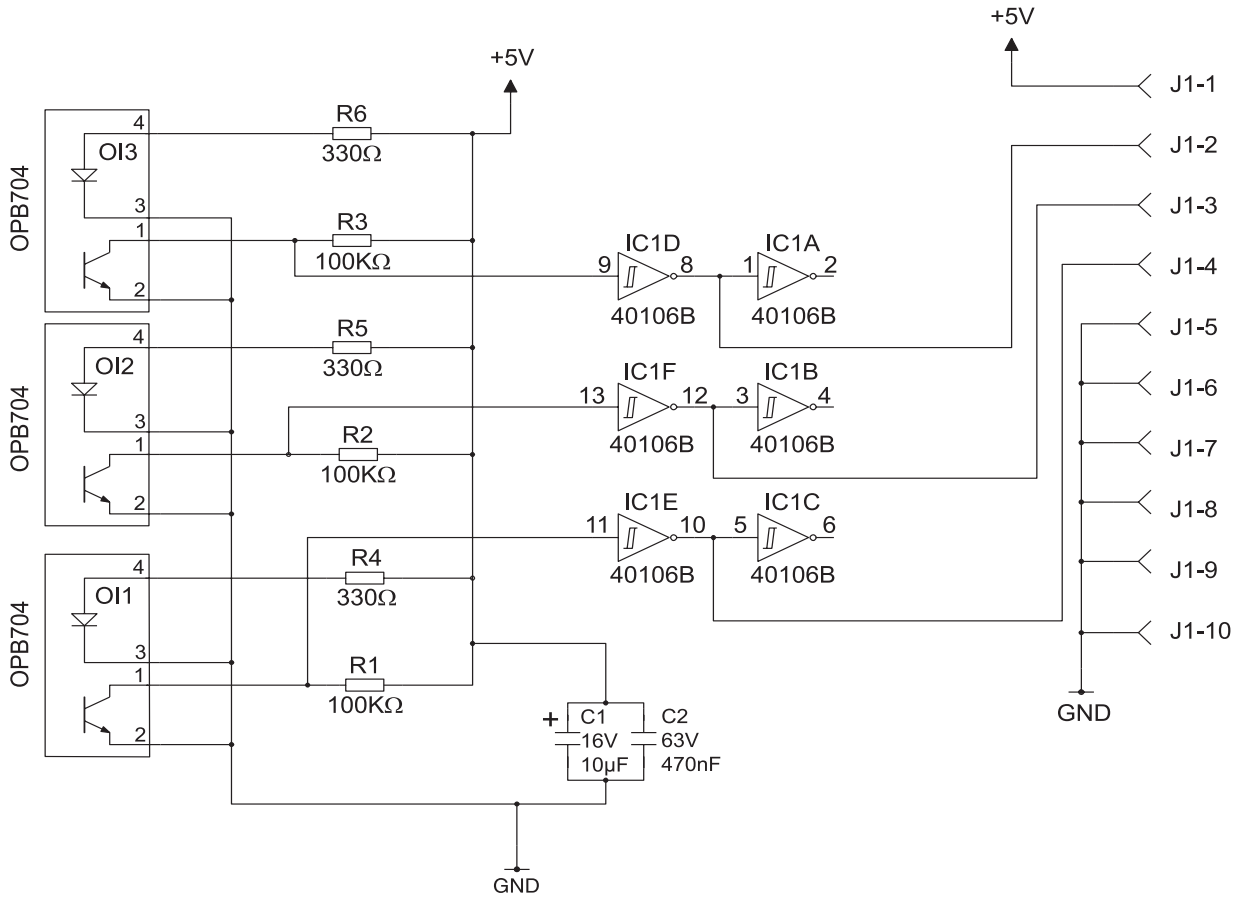

Fig. 33 Opto board

6. MAINTENANCE

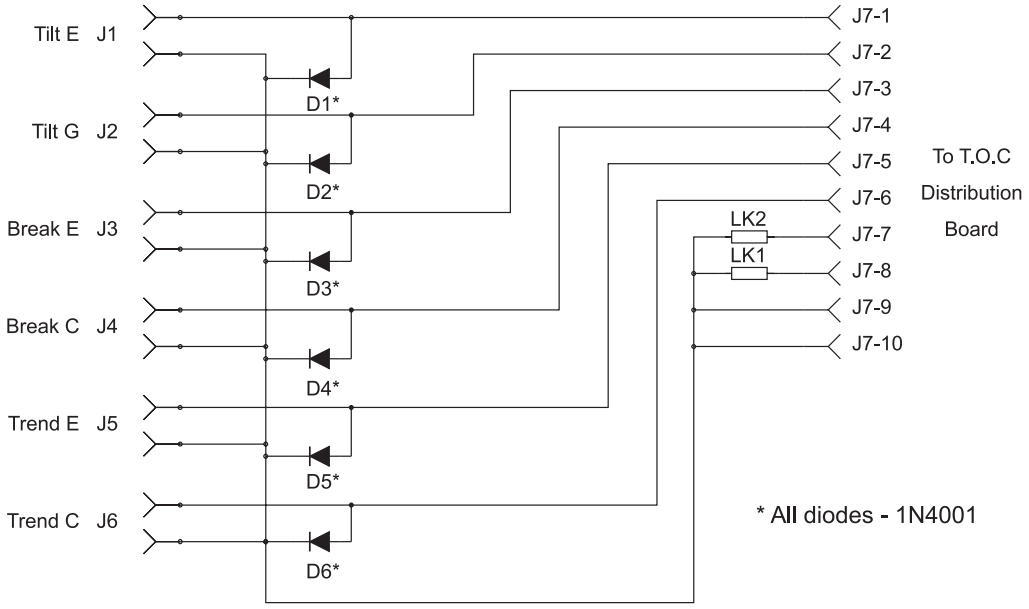

Fig. 34 Top-of-column solenoid board

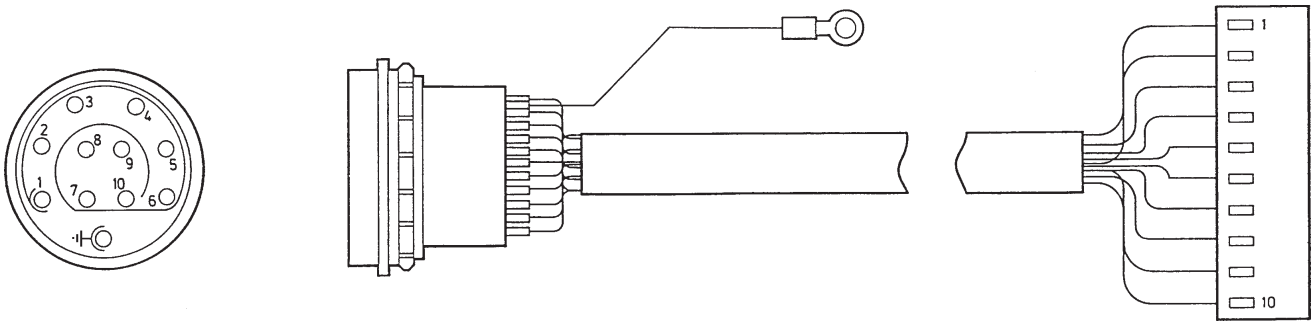

Fig. 35 Pin connections

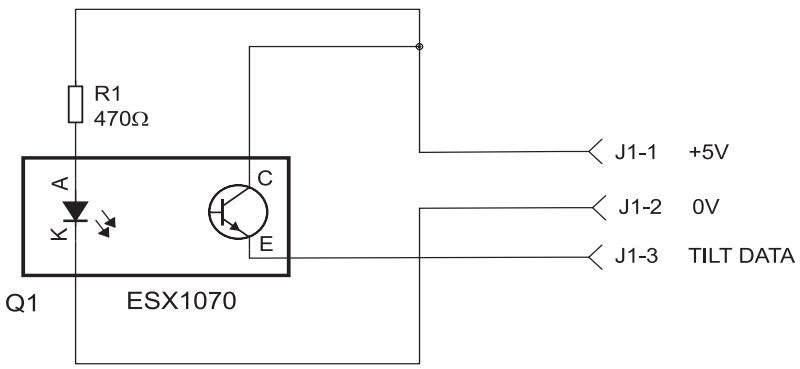

Fig. 36 Tilt opto board

6. MAINTENANCE

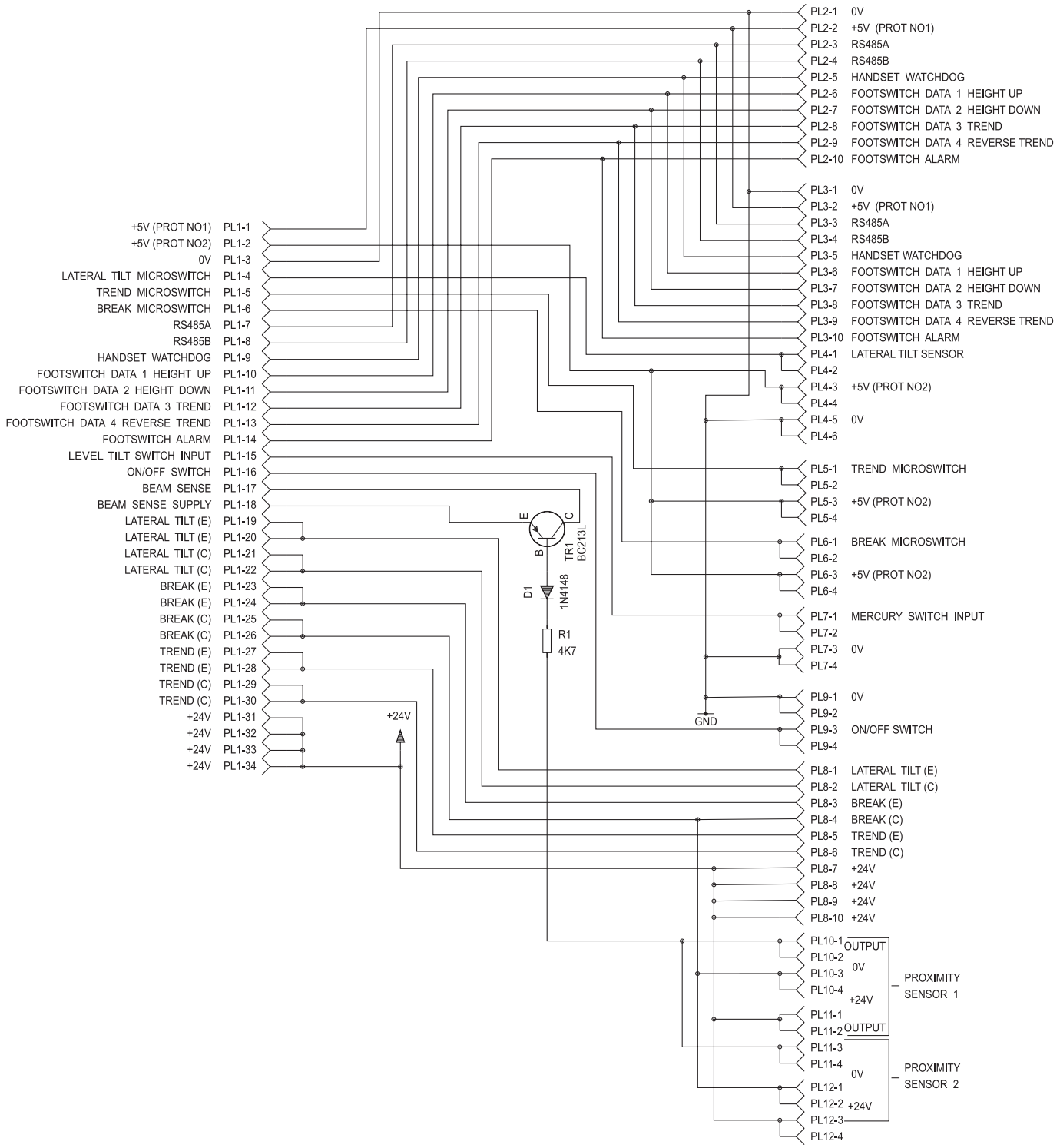

Fig. 37 Top-of-column distribution board

6. MAINTENANCE

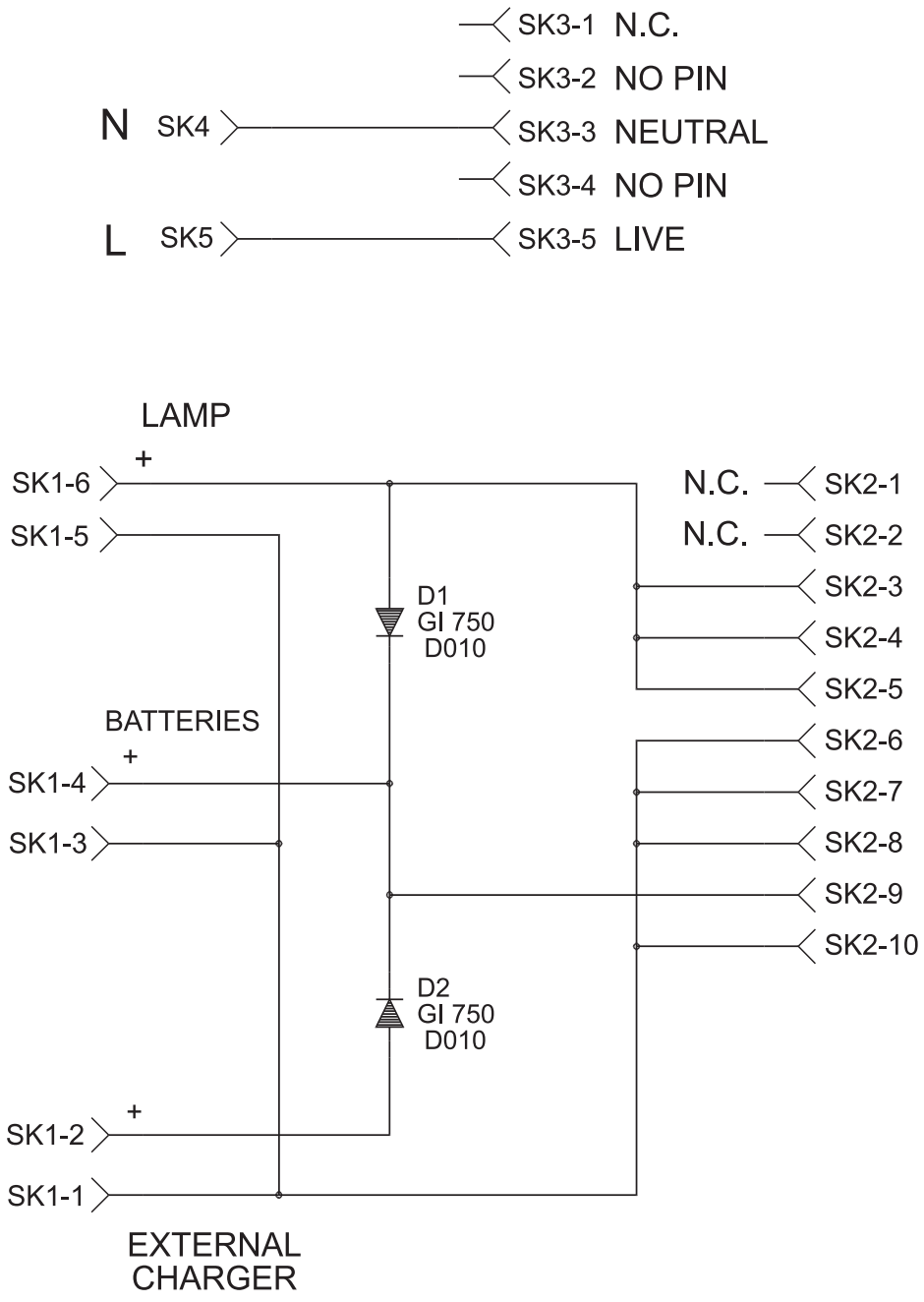

Fig. 38 Battery charger distribution board

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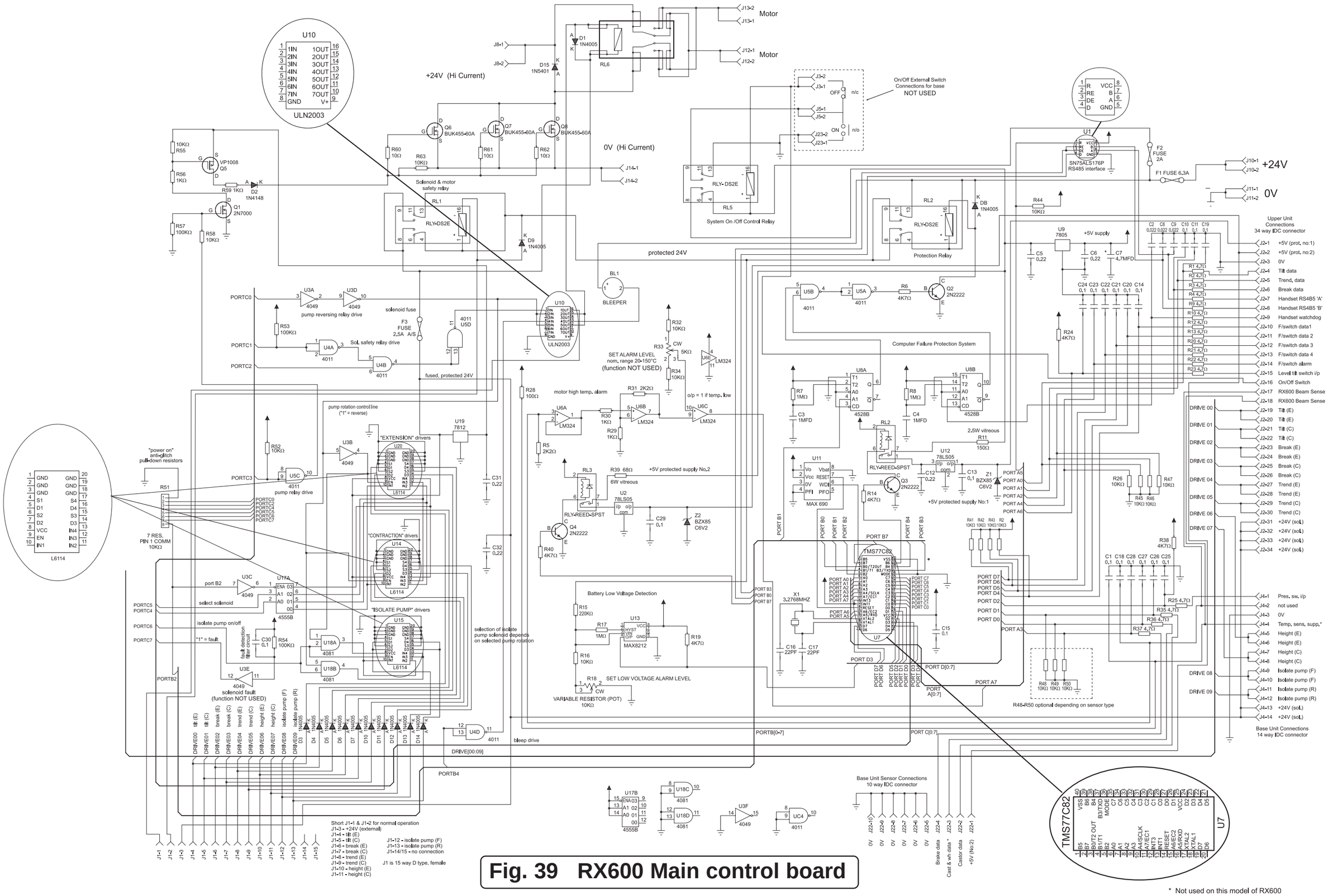
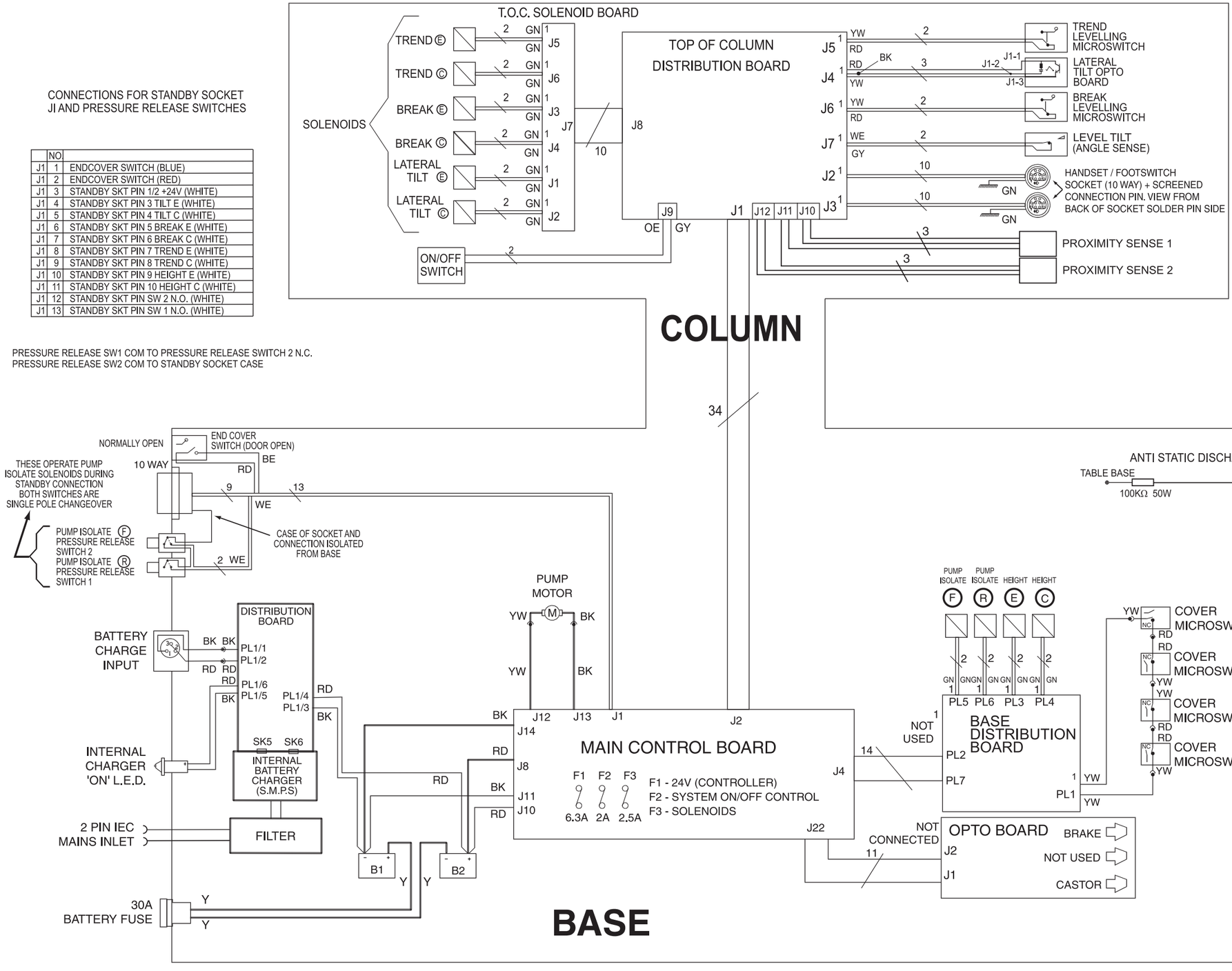

Motor
Motor
+24V (Hi Current)
0V (Hi Current)
On/Off External Switch Connections for base
NOT USED
System On /Off Control Relay
Protection Relay
protected 24V
Computer Failure Protection System
Solenoid & motor safety relay
pump reversing relay drive
Sol. safety relay drive
solenoid fuse
fused, protected 24V
SET ALARM LEVEL nom. range 20-150°C (function NOT USED)
motor high temp. alarm
o/p = 1 if temp. low
pump rotation control line ("1" = reverse)
"power on" anti-glitch pull-down resistors
pump relay drive
"EXTENSION" drivers
"CONTRACTION" drivers
"ISOLATE PUMP" drivers
+5V protected supply No.2
+5V protected supply No:1
Battery Low Voltage Detection
SET LOW VOLTAGE ALARM LEVEL
VARIABLE RESISTOR (POT) 10KΩ
port B2
select solenoid
isolate pump on/off
"1" = fault
fault detection filter circuit
solenoid fault (function NOT USED)
selection of isolate pump solenoid depends on selected pump rotation
bleep drive
+5V supply
Upper Unit Connections 34 way IDC connector
Base Unit Connections 14 way IDC connector
Base Unit Sensor Connections 10 way IDC connector
R48-R50 optional depending on sensor type
Short J1-1 & J1-2 for normal operation
J1-3 - +24V (external)
J1-4 - tilt (E)
J1-5 - tilt (C)
J1-6 - break (E)
J1-7 - break (C)
J1-8 - trend (E)
J1-9 - trend (C)
J1-10 - height (E)
J1-11 - height (C)
J1-12 - isolate pump (F)
J1-13 - isolate pump (R)
J1-14/15 - no connection
J1 is 15 way D type, female

Fig. 39 RX600 Main control board

* Not used on this model of RX600

WIRE DESCRIPTIONS



MAIN CONTROL BOARD J4

- J4-1 PRES. SW. I/P
- J4-2 TEMP. SENS. RTN.
- J4-3 0V
- J4-4 TEMP. SENS. SUPP.
- J4-5 HEIGHT Ⓔ
- J4-6 HEIGHT Ⓔ
- J4-7 HEIGHT Ⓒ
- J4-8 HEIGHT Ⓒ
- J4-9 ISOLATE PUMP Ⓕ
- J4-10 ISOLATE PUMP Ⓕ
- J4-11 ISOLATE PUMP Ⓡ
- J4-12 ISOLATE PUMP Ⓡ
- J4-13 +24V (SOL.)
- J4-14 +24V (SOL.)

T.O.C. SOLENOID BOARD J7

- J7-1 LAT TILT Ⓔ
- J7-2 LAT TILT Ⓒ
- J7-3 BREAK Ⓔ
- J7-4 BREAK Ⓒ
- J7-5 TREND Ⓔ
- J7-6 TREND Ⓒ
- J7-7 24V D.C.
- J7-8 24V D.C.
- J7-9 24V D.C.
- J7-10 24V D.C.

MAIN CONTROL BOARD J2

- J2-1 +5V (PROT. NO:1)
- J2-2 +5V (PROT. NO:2)
- J2-3 0V
- J2-4 TILT DATA
- J2-5 TREND DATA
- J2-6 BREAK DATA
- J2-7 HANDSET RS485 'A'
- J2-8 HANDSET RS485 'B'
- J2-9 HANDSET WATCHDOG
- J2-10 F/SWITCH DATA 1
- J2-11 F/SWITCH DATA 2
- J2-12 F/SWITCH DATA 3
- J2-13 F/SWITCH DATA 4
- J2-14 F/SWITCH ALARM
- J2-15 LEVEL TILT SW. I/P
- J2-16 N/C
- J2-17 N/C
- J2-18 N/C
- J2-19 TILT Ⓔ
- J2-20 TILT Ⓔ
- J2-21 TILT Ⓒ
- J2-22 TILT Ⓒ
- J2-23 BREAK Ⓔ
- J2-24 BREAK Ⓔ
- J2-25 BREAK Ⓒ
- J2-26 BREAK Ⓒ
- J2-27 TREND Ⓔ
- J2-28 TREND Ⓔ
- J2-29 TREND Ⓒ
- J2-30 TREND Ⓒ
- J2-31 +24V (SOL.)
- J2-32 +24V (SOL.)
- J2-33 +24V (SOL.)
- J2-34 +24V (SOL.)

MAIN CONTROL BOARD J22

- J22-1 +5V (NO:2)
- J22-2 CASTOR DATA
- J22-3 CASTOR & WH DATA
- J22-4 BREAK DATA
- J22-5 0V
- J22-6 0V
- J22-7 0V
- J22-8 0V
- J22-9 0V
- J22-10 0V

NOTES

1 MICROSWITCHES NORMALLY CLOSED EXCEPT FOR END COVER SWITCH (LEVEL TILT SWITCH NORMALLY OPEN AND LEVELLING SWITCHES CHANGE STATE)

2 OPTO LOGIC - HIGH WHEN REFLECTION RECEIVED NORMALY LOW UNSWITCHED

3 FOR HANDSET / FOOTSWITCH SOCKET WIRING :- PIN 1 ON MOLEX CONNECTOR WIRED TO PIN 1 ON LEMO CONNECTOR ETC

4 IN LINE CONNECTOR

5 COLOURS

RD - RED	PK - PINK
BK - BLACK	WE - WHITE
YW - YELLOW	OE - ORANGE
GN/YW - GREEN / YELLOW	BE - BLUE
GY - GREY	GN - GREEN

6 BOLD LINE INDICATES :- 84 / 0.3 CONDUCTOR

7 Ⓔ Ⓒ EXTEND FORWARD — Ⓕ Ⓡ CONTRACT REVERSE

Fig. 40 RX600 System diagram